An analysis of the information and communication needs surrounding intensive care unit inter-hospital bed sourcing, referral and transfer coordination

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Declaration

I declare that the work described in this dissertation is, except where otherwise stated, entirely my own work, and has not been submitted as an exercise for a degree at this or any other university.

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Summary

Substantial evidence exists proving the negative effects of a delayed admission to an intensive care unit (ICU) bed. The patient who needs a transfer to an ICU bed can experience delays in the emergency department, on the ward, or in another ICU. ICU bed capacity deficits exist in Ireland and are further compounded by impeded information and communication flow surrounding bed sourcing, referral and transfer coordination.

The purpose of this qualitative multisite study was to analyse information and communication needs surrounding the inter-hospital ICU bed sourcing, referral and transfer coordination; and the related intra-hospital discharge coordination. Presently information is transmitted and received by telephone and fax from clinician to clinician in an uncoordinated fashion.

Qualitative interviews and open-ended on-line surveys were used to investigate current information flow and based on an analysis of the findings recommendations are made to include a central bed management database.

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Abbreviations

BIPAP - Bilevel Positive Airway Pressure

COAD – Chronic obstructive airways disease

CRRT - Continuous renal replacement therapy

BIS - Bed information system

ECMO - Extracorporeal Membrane Oxygenation

DOH - Department of Health

ED - Emergency Department

HDU - High Dependency Unit

IHT - Inter-hospital Transfer

HIT - Health Information Technology

HIQA - Health Information and Quality Authority

HSE - Health Service Executive

ICT - Information and Communication Technology

ICU - Intensive Care Unit

IOM - Institute of medicine

Glossary of Terms

Anaesthetist:

The anaesthetist (British English), anaesthesiologist (US English) is a physician who provides medical treatment to patients in various situations, usually acute. Outside the operating room, anaesthetists deal with hospital emergencies, intensive care units, acute and chronic pain consultations. Anaesthetists are able to utilize their extensive knowledge of physiology, pharmacology and diseases to guide their decision making.

Bed management:

The allocation and provision of beds in a hospital where beds in specialist wards are a scarce resource. The "bed" in this context represents not simply a place for the patient to sleep, but the services that go with - being cared for by the healthcare professionals.

Charge Nurse:

The nurse is responsible for the immediate functioning of the intensive care unit. The charge nurse is responsible for ensuring that nursing care is delivered safely and for the coordination of activities for optimal patient care.

Database:

A collection of information that is organised so that it ican be accessed, managed and updated.

Intensive Care Unit (ICU):

The unit that caters for patients with life-threatening illnesses which require constant, close monitoring and support from specialist equipment and medications in order to ensure normal bodily functions. The nurse to patient ratio is 1:1.

Intensive Care Patient:

A patient whom requires continuous monitoring, point of care diagnostics and complex supportive therapy.

Chapter 1 Introduction

"*Safe healthcare is dependent on access to, and use of, accurate, valid, reliable, timely, relevant, legible and complete information.*"

(HIQA, 2011)

Presently information is transmitted and received by telephone and fax from clinician to clinician in an uncoordinated fashion to source, refer and coordinate the intensive care inter-hospital transfer. Communication and information needs of anaesthetists, charge nurses and bed managers are explored using qualitative interviews and open-ended on-line surveys. Based on an analysis of the findings recommendations are made for a central bed management database.

The health information and quality authority of Ireland report that 30% of the total health budget is spent on handling information (HIQA, 2012). To ensure quality and safety in Irish healthcare delivery, effective collection, searching and storing of information is necessary.

The Institute of Medicine (IOM) outline six aims for health system improvement (IOM, 2001).Three of these aims include:

I. Timeliness - reducing waits and possibly harmful delays.
II. Efficiency - avoiding waste to include the waste of equipment, supplies, ideas and energy.
III. Equitable care - providing care that does not vary in quality due to gender, ethnicity, geographic location or socioeconomic status.

The IOM propose a number of recommendations - one is the need for information to be shared and to flow freely whilst ensuring confidentiality and privacy.

The patient who needs a transfer to an intensive care bed for organ failure support can experience delays in the emergency department (ED), in the ward, or in another (ICU), where certain organ support treatments are not available (Gray et al., 2004). Timely access to critical care when needed is an acute health care system priority and is an imperative for a positive patient outcome (Prospectus strategy consultants, 2009).

1.1 Impacts of a delayed ICU admission

A delay in transfer to an ICU bed is associated with increased mortality, morbidity, longer hospital stays and higher costs (Metcalfe et al., 1997, Young et al., 2003, Duke et al., 2004, Chalfin et al., 2007, Cardoso et al., 2011, Huynh et al., 2014). Recent studies concur that muscle loss, contractures, pain, depression, post-traumatic stress disorder and long-lasting delirium are all associated morbidities with an ICU bed attainment delay (Herridge et al., 2003, Dowdy et al., 2005, Davydow et al., 2008). In fact, each hour waiting in the emergency department (ED) is associated with a 1.5% increased risk of death for a delayed critically ill patient (Cardoso et al., 2011). The *golden hour concept* relates to treatment times for trauma patients (Cowley, 1975). This concept suggests that treatment in the first hour of injury has a mortality rate of 10% and treatment within eight hours has a mortality rate of 75%. Therefore, timely and appropriate trauma patient treatment is positively correlated with mortality (Avtgis et al., 2010).

There is a definite trend towards the early timing of continuous renal replacement therapy (CRRT) resulting in a better patient outcome for critically ill patients in acute renal failure (ARF). However, there remains a lack of evidence comparing early to late commencement of treatment (Gettings et al., 1999, Ronco et al., 2001, Bouman et al., 2002, Bellomo et al., 2004, Demirkilic et al., 2004, Elahi et al., 2004, Jiang et al., 2005).

The downstream effects of critically ill being treated in the ED include crowding and compromised care to other patients (Lucas et al., 2009, Falvo et al., 2007). The lack of purpose design built and trained staff preventing the provision of extended critical care, can impose undue stress upon the staff caring for these patients outside of an ICU (Cardoso et al., 2011, Simchen et al., 2007). In addition, in Africa, it has been argued that untreated critical illness (leading to mortalities) can harm national economies (Kirigia et al., 2006).

1.2 Background and context

Ireland has 6.5 intensive care beds per 100,000 population compared with the European average of 11.5 per 100,000 population (Appendix 1). An increase in the aging population, the increased threat of surges due to human and natural disasters, increasing medical and technological advances, means that the ICU domain is predisposed to ever increasing demands (Adhikari et al., 2010, Needham et al., 2005, Rubinson et al., 2005). As far back as 1997 the demand for ICU was reported to be the fastest growing health service in Australia (DOHS,

1997) all the while a global increase in consumer expectations for healthcare compound these demands (Williams et al., 2010).

Most ICUs operate near full capacity and have been reported to consume 15-40% of a hospital's overall budget (Brilli et al., 2001) making ICU beds a premium resource. Futile treatments are being observed and at times disputed, therefore more appropriate ICU admission and discharge criteria are been speculated into the future (Huynh et al., 2014).

In Ireland health system reform is being by the Department of Health (DOH), the Health Service Executive (HSE), the Health Information and Quality Authority (HIQA) and the national clinical programs (Hse, 2014). The Model of care for Adult Critical Care defends a safe, effective, efficient and timely pathway for critically ill patients throughout the republic and insists that access to an organized critical care capacity system leads to positive patient outcomes (Hse, 2014). The adult critical care model describes a 'hub and spoke' configuration for critical care services to integrate, centralize and tier needs between a regional/supra-regional 'hub' and sub-regional 'spoke' hospitals (Appendix 2), as recommended by the 2009 HSE prospectus report (Prospectus strategy consultants, 2009, Hse, 2014).

The critical care hub and spoke configuration is described in line with the hospital group configuration as outlined by the Department Of Health (DOH, 2013). Hospital groups offer a tiered acute hospital delivery system within hospital trusts (Appendix 3).

Depending on the condition of a critically ill patient, or level of critical care needed, they may need to be transferred from one hospital to another (Iwashyna et al., 2009). The national standards for Adult Critical Care has five levels of acute care needs (Hse, 2014) Appendix 4 provides an outline of these 5 levels.

The level of care refers to the level of care needed and services provided in secondary care:

I. Level 0 refers to hospital ward care
II. Level 1 refers to higher observation care, for example post anaesthetic care unit.
III. level 2 critical care refers to critical care management of primarily single organ failure.
IV. level 3 critical care refers to 2 or more organ failures.
V. Level 3 refers to level 3 with CRRT and a national service.

The hospital model refers to the level of services provided as described by the national critical care programme, under the national critical care framework:

I. A model 2 hospital has no critical care service
II. A model 3 hospital has a spoke ICU providing level 2 and 3 critical care.
III. A model 4 (regional) hospital has a hub ICU providing level 2,3 and CRRT (continuous renal replacement therapy).
IV. A model 4 (supra- regional) hospital has a hub ICU providing level 2, 3, regional and 3s a national service (Power, 2015).

In this research study the recommended spoke, regional and supra-regional ICUs are referred to as spoke, regional and supra-regional ICUs.

Plans are currently being developed and implemented in Ireland to improve ICU access, optimise resource utilisation and enhance patient outcomes. A national ICU audit was set up in 2014 to measure the quality of care, level of activity, and to enable research in ten ICUs around Ireland (NOCA, 2014). Quality measurements can be benchmarked against other national ICUs and ICUs in the United Kingdom. The activity in these ICUs is measured, to aid service planning and resource utilisation. Data collected in these units on procedures and diagnoses is used for future research and reimbursement purposes. Critical care registries in other countries collect data on disease severity and patient outcome which provide valuable information. Quality comparisons, quality improvement initiatives and best evidence-based ICU practice can be realised and promoted (Martin, 2008, MRIC, 2009).

The mobile intensive care ambulance (MICAS) was set up in 1996 to provide a centralised retrieval service for the critically ill in Ireland (Rohan et al., 2006). It is a safe service, however it is not in operation 365 days a year. The national transport medical programme (NTMP) is developing a national retrieval system for the adult critically ill to ensure the right patient, gets to the right care, in the right condition, in the right time, by trained and skilled health professionals (NTMP, 2011). Therefore, the MICAS has plans , and is now funded, to operate 8am-8pm, 7 days per week from Dublin, Cork and Galway (NTMP, 2011). This service also predicts a single phone line for requests, the development of policies for transport, standardisation of transport documentation and adherence to the Health Information and Quality Authority's (HIQA) national standards. In addition, a critical care bed bureau is speculated to provide live information on critical care bed availability in all units nationwide thus reducing delays in ICU bed attainment (Hse, 2014) and it has been suggested that the bed

information system (BIS) will be linked to a proposed dispatch/retrieval system (Mulholland, 2014).

The Irish government has plans to implement health information technology initiatives in secondary care to reduce the pressure on hospitals. However, the Joint Commission advocates the examination of workflow processes and procedures for risks and inefficiencies, and to resolve these issues prior to any technology implementation(JCI, 2008).Medical information system designers need to understand the nature and scope of the actual clinician information needs before appropriate supportive technologies can be built (Forsythe et al., 1992). The organisational nature of the work must also be recognised, which means understanding the relationship between clinical patient care and organisational issues (Reddy et al., 2002).

1.3 Motivation

Compounding the low ICU bed capacity there are bed referral deficits in Ireland with a reported 300 phone call referral refusals in thirty days (Prospectus strategy consultants, 2009). The 2009 prospectus report recommended an increase from 289 ICU beds to 418 ICU beds in the thirty-seven hospitals - however between 2008 and 2013 there has been a loss of 32 ICU beds in Ireland (Hse, 2014). Phone calls between local and regional hospitals are timely and, at times, major tertiary services prove difficult to access. There is also a lack of transfer protocols resulting in long phone call and negotiation sessions (Prospectus strategy consultants, 2009). Typically the anaesthetist on call phones many other ICUs one by one in an attempt to acquire an ICU bed as soon as possible. To ensure a positive patient outcome, time is a critical factor, however this current system is time intensive (MOH, 2013).

The sense from some clinicians in the research domain is that the current large and growing demand for, and economically scarce supply of, ICU bed resources is further compounded by deficits in important information flows when sourcing and referring an ICU patient. In addition, many clinicians in the research domain feel overwhelmed during ICU capacity surge periods. Some other clinicians in the domain feel that the delay in getting the urgent ICU patient into an ICU bed is further compounded by the delay in getting an available ward bed for the patient who can be discharged from ICU.

1.4 Research Aims and Objectives

The study aims to:

I. Explore and analyse information and communication needs surrounding intensive care unit bed sourcing and referral.

II. Explore and analyse information and communication needs surrounding ICU inter-hospital transfer and intra-hospital discharge coordination.

III. Explore and analyse how phone calls are perceived

IV. Determine if a central bed management database can facilitate timely bed sourcing.

The five objectives are to qualify using primary and secondary research methodologies:

I. Anaesthetic information and communication needs surrounding the ICU inter-hospital bed sourcing and referral, when an ICU patient needs an inter-hospital transfer.

II. ICU Charge Nurse information and communication needs surrounding ICU inter-hospital admission and discharge coordination to include the ICU intra-hospital bed sourcing and discharge coordination.

III. Bed manager information and communication needs surrounding ICU intra-hospital discharge coordination.

IV. How phone calls are perceived

V. How a central bed management database can facilitate timely bed sourcing

The four research questions:

1. What are the information and communication needs surrounding ICU inter-hospital bed sourcing and transfer coordination?
2. What are the information and communication needs surrounding ICU inter-hospital transfer and intra-hospital discharge coordination?
3. How are the phone calls perceived?
4. How can a central bed management database facilitate timely bed sourcing?

1.5 Overview of the Research

The multisite study was carried out in a recommended spoke ICU, a recommended regional hub ICU and a recommended supra-regional ICU. The study examines information and communication needs surrounding ICU inter-hospital bed sourcing, referral and transfer coordination; and intra-hospital discharge coordination. The research questions were addressed primarily through qualitative face-to-face interviews with anaesthetists, charge nurses and bed managers. The anaesthetic and charge nurse interviews were validated using the same open-ended questions in an on-line survey. A literature review was conducted to establish qualitative studies surrounding ICU inter-hospital bed sourcing and referral; and shift leader's information and communication needs for effective coordination. Centralised bed management databases at national and regional level were reviewed in the literature and, based on an analysis of the findings a recommendation for such a system is outlined.

1.6 Overview of the Dissertation

This chapter has presented the motivation for the research, the research aims, objectives and questions and has given an overview of the research and an overview of the dissertation.

Chapter 2 provides the literature review. It first looks in some detail at the ICU inter-hospital bed sourcing and referral processes, and it then investigates charge nurse and bed manager information and communication. The chapter then explores how a central bed management database can facilitate timely bed sourcing.

Chapter 3 presents the research study design, which uses both face-to-face interviews and an on-line survey to answer the research question. It describes in detail the research strategy, modes used to collect the data, and data analysis method chosen. The chapter also details the pilot study and ethical considerations.

Chapter 4 presents the detailed results of the study, divided into anaesthetist, Charge nurse and Bed Manager results.

Chapter 5 analyses and discusses the results of the study, in light of the findings and in light of what has been found in other research studies, in an endeavour to resolve the research questions.

Chapter 6 concludes the dissertation and makes recommendations for a central bed management database This chapter also includes the study’s limitations and future areas of research.

Chapter 2 Literature Review

2.1 Introduction

Data was collected from secondary sources to help answer the research study's questions. The literature review identified some information and communication needs surrounding ICU inter-hospital transfer. The literature review also provided the platform from where the qualitative research questions for this study were formulated. In addition, the literature review assisted with answering research question 4 in section 1.4, namely how a central bed management database can facilitate timely bed sourcing.

2.2 Search Strategy

Some of the keywords and terms used for this literature review included *intensive care unit* AND *inter-hospital transfer*, *information needs* AND *intensive care units*, *communication* AND *intensive care units, delayed discharge* AND *intensive care unit, intensive care unit AND bed information system, intensive care unit AND bed bureau, intensive care unit AND bed capacity management system, intensive care unit* AND *central bed management database.*

The literature was initially searched using the electronic database PubMed followed by Google Scholar, Web of Knowledge and ScienceDirect. A general search was carried out to seek out material around intensive care unit bed management databases - this search strategy was a challenge because there was limited literature around central bed management systems particularly relating to ICU.

2.3 Sourcing an ICU bed

The IHT negotiation is carried out between the sending and the receiving anaesthetist directly over the phone. Important patient information is shared to include patient's clinical condition, treatments given, and reasons for transfer (Sethi and Subramanian, 2014). Typically the anaesthetist on call phones many other ICUs one by one in an attempt to acquire an ICU bed, as soon as possible (MOH, 2013). To ensure a positive patient outcome, time is a critical factor (Hsu et al., 1999).

A 2006 systematic literature review of the critical care inter-hospital transfer (IHT) process revealed it has evolved into a technically safe one worldwide, once the transfer ICU bed has been found (Fan et al., 2006). However, as Iwashyna admits in 2012, the process is still an incomplete infrastructure because there are organizational issues in finding and negotiating the ICU bed (Iwashyna, 2012). As described by Edwards (2010), infrastructures are basic

systems and services that are reliable, standardized, require little user interaction and are widely accessible (Edwards, 2010).

This process is coordinated by mutual adjustment (Mintzberg, 1979). Mutual adjustment means communicating informally and is typically used in complex work situations where the most important elements of coordination are down to employees training and communication skills. According to Mintzberg (1979), tasks in an organization can be coordinated in five major ways: mutual adjustment, standardization of processes and/or standardization of outputs, standardization of worker skills and direct supervision.

2.3.1 Qualitative studies on arranging and generating the ICU inter-hospital transfer

There is limited literature around in-depth qualitative studies on the process of arranging or generating the ICU transfer from the sending/transferring hospital to the receiving hospital (Craig, 2005, Bosk et al., 2011). Craig (2005) carried out a six-month observational study on all patients referred from a small hospital's emergency department (ED) in Melbourne Australia (Craig, 2005) and studied the number of phone calls, the time taken for a proposed transfer to be accepted and the total patient time spent in the ED. The study found that the more critical patients required more phone calls back and forth as a result of multiple decision makers needing to agree on the transfer, this process resulted in significant delays. An ideal situation where the transfer is initiated with a single phone call is suggested. A pre-agreed guideline on transfer, changes to internal hospital systems and continual education of rural doctors regarding existing resources is suggested. The department of human services in Melbourne had previously flagged the lack of state-wide coordination, policy development and quality monitoring surrounding the inter-hospital transfer process (DOHS, 2001). Craig (2005) calls for further studies to identify existing obstacles to timely and appropriate ICU inter-hospital transfers.

In 2011, Bosk et all carried out an in-depth, micro-level, from the ground up qualitative exploratory study on the under developed inter-hospital transfer (IHT) process from a community hospital in the USA (Bosk et al., 2011). This study ascertained the inter- hospital patient transfer process from the perspective of the sending hospital. Semi-structured qualitative interviews with care-providers at three purposively sampled community hospitals were carried out. The negotiating process was found to be informal and cumbersome whilst placing a significant burden on the community hospital staff. The transfer process entailed significant inter-organizational friction and was not focused on optimizing patient outcomes.

This study proposes the development of a fluid transfer infrastructure by protocolization of issues between the referring and the destination hospital and effective deployment of health information technology. Bosk (2011) calls for complimentary data from ethnography to compare actual behaviour with self-reported behaviour; and, from the perspectives of other critical care providers, to address other areas of interest such as particularly influential practitioners in decision-making.

A 2014 Canadian study, which carried out a needs assessment in a community hospital's critical care unit, identified deficits between the community and referral hospital's inter-hospital transfer (Sarti et al., 2014). This team of research experts used a mixed methods approach and collected data from questionnaires, interviews, focus groups and hospital walk throughs. A conceptual framework, as outlined below in Figure 2.1, was used to understand the key factors, constructs, variables and relationships among the different elements in the complex critical care transfer system. As well as the human resource and physical equipment capital, the social capital is represented. The social capital depicts the connections between professionals within the community hospital, and, between the community and referral hospital. Each element of this system requires a different data collection method, for optimum data collection, Appendix 5 provides the descriptive meta-matrix.

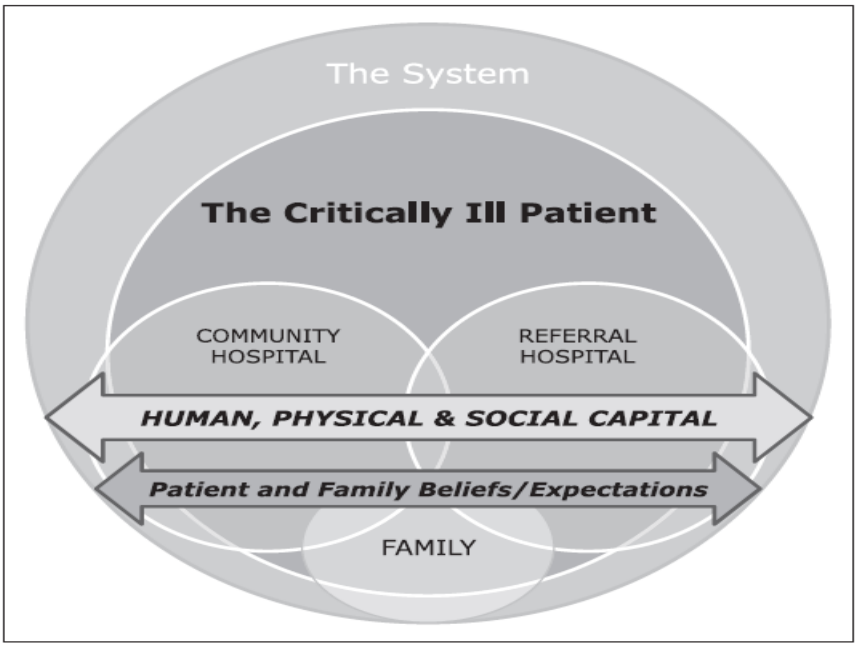

Figure 2.1Complex Critical Care Conceptual Framework

(Sarti et al., 2014)

The study suggests tailored organizational interventions such as the monitoring of transfers, the designation of a responsible individual and the setting up of a central bed management process, Appendix 6 provides the organisational, clinical and educational solutions. The study speculates that the solutions to the current failings would facilitate smooth inter-hospital patient flow, maximise ICU bed use and provide equal access to quality critical care regardless of patient location (Sarti et al., 2014).

Bosk et al (2011) call for health information technology deployment and has identified further obstacles in the inter-hospital transfer, as called for by Craig (2005), further investigation is required in Ireland before health information technology implementation in the arena because, as highlighted by Berg (1999), gaining an insight into the work processes where an information technology (IT) system is to be used, is the first sociotechnical step to a good administrative or clinical IT system design (Berg, 1999).

2.4 Issues around coordinating ICU intra-hospital discharges

The hospital bed management function has being likened to an air traffic control tower for patient placements, the information must be real-time and mission critical (Coulombe and Posow, 2004).

There are three reasons for intra-hospital transfer delays out of the ICU (Williams et al., 2010): 1) no bed available on the ward, 2) a delay in making the ward bed available, and 3) medical concern for patient outcome should they be transferred.

2.5 ICU shift leader information needs and communication needs

Organisational tasks such as bed management keep an ICU functioning so as to provide beds for new patients and to coordinate ICU activities. Shift leaders need easy and timely access to the right information (Gurses et al., 2009). ICU care coordination involves resource coordination as well as patient care coordination (Miller et al., 2010) and serious problems can occur if coordination decision making is delayed due to information attainment delay (Lundgrén-Laine et al., 2013).

Shift leader ad-hoc decisions are both process–focused and situation-focused, see Figure 2.2 below (Lundgrén-Laine et al., 2013). It is noteworthy that ICU charge nurse ad hoc decisions are mostly around human resource levels, human resource know-how, patient admissions and patient discharges. Anaesthetist ad hoc decision making is mostly around patient information, vital signs, special treatments and diagnostics (Lundgren-Laine et al., 2012).

Accurate real-time information is needed for accountable ICU Charge Nurses to ensure that the right tasks are performed, under the right circumstances, and with the right people at the right time (Lundgrén-Laine et al., 2013). Although clinical patient information is well supported in ICUs by health information technology (HIT), the ICU Charge Nurse managerial activities, such as coordination of staff and patient flow, are poorly supported by information technology. See Appendix 7 for Charge Nurse information needs in both Finland and Greece.

In order to develop electronic decision-making support and management system for ICUs, the fundamental information needs of shift leaders' is a prerequisite (Lundgren-Laine et al., 2011).

Categories, amounts, coding frequencies of *ad hoc* decisions, number of *ad hoc* decisions, interrater reliability values and observation times

Categories of *ad hoc* decisions	**Shift leaders**	**Intensivists (*n* = 8)**	**Charge nurses (*n* = 12)**
Process-focused, *n* (%)			
1. Human resources and know-how	291 (32.1%)[b]		291 (63%)[b]
2. Material resources	22 (2.4%)		22 (4.8%)
Situation-focused, *n* (%)			
3. Patient admissions	32 (3.5%)	3 (0.7%)	29 (6%)
4. Patient information and vital signs	246 (27%)[b]	174 (39%)[b]	72 (16%)[b]
5. Special treatments	171 (19%)[b]	147 (33%)[b]	24 (5%)
6. Diagnostics	86 (9.5%)	86 (19%)[b]	
7. Adverse events	1 (0.1%)		
8. Patient discharges	58 (6.4%)	34 (8%)	24 (5%)
IRR[a] (%)/Cohen's Î°		97.0/0.92 to 1.0	91.0/0.90 to 1.0
Total *ad hoc* decisions, *n*	907	444	463
Total observation time, hours	92	30	62

[a]IRR = interrater reliability; [b]largest categories.

LundgrÃ©n-Laine *et al.Critical Care* 2011 **15**:R188 doi:10.1186/cc10341

Figure 2.2 Charge Nurse and Anaesthetic Ad Hoc Decisions

(Lundgrén-Laine et al., 2013)

2.6 Medical information exchange and communication

Organisational behaviour experts have long known, that the breakdowns or barriers to effective information communication are noise, status differences, time pressures and overload (Moorhead and Griffin 1998). A communication system is balanced when an information load is balanced with human processing capabilities (O'Reilly, 1980). When a

receiver does not have enough time to understand incoming messages or when there are too many messages he or she may misunderstand some of them. Therefore, effective organisational communication provides the right information, to the right person, at the right time and in the right form (Moorhead and Griffin 1998).

As previously outlined in Section 1.1, rural trauma patients are negatively affected by delays in inter-hospital transfer processes. Rural trauma patients especially require an improved inter-hospital process in order to prevent mortalities because additional delays to treatments are incurred following a patient's arrival at a rural hospital (Mango and Garthe, 2007). Effective on the scene triage, circumventing local hospitals and directly transporting to a trauma centre can result in better outcomes (Young et al., 1998) and, interestingly, problematic communication identification (Rossi et al., 2009) and synchronous video conferencing introduction (Doheny-Farina et al., 2003) have yielded positive results. Accordingly, Avgis et al (2010) tested the effects of communication training on the inter-hospital trauma transfer process from rural to tertiary hospitals and reported decreased patient transfer times. The standardization of medical information exchange and the relaying of that information in an affirming way have proved to be an effective time saving strategy. An affirming communication style validates the experience of the other individual whilst providing a climate conducive to continual productive, relaxed and attentive discussion.

2.7 Centralised bed management database

2.7.1 Sri Lanka

In a developing country setting, Sri Lanka has implemented a 24/7, reliable, island-wide ICU bed availability system for adult and paediatric critically ill patients (MOH, 2013). The system allows for more chances of finding an appropriate ICU bed quickly. Bed updates are received from each ICU via the National Intensive Care Surveillance (NICS) software. If the update is not received from the ICU at the specified time, a phone update is obtained. Any doctor requiring an ICU bed can call the NICS hotline.

The following details are required: the doctor's name, contact details, patient location, hospital phone number, patient name and type of ICU bed required. The doctor requesting the bed is provided with phone numbers of the three closest available ICU units where a bed is available; this data is based on the last bed update. Doctors are informed that a bed is not guaranteed at this point because local circumstances may have changed in the interim. The surveillance centre then phones the doctor two hours later to determine patient status. If the patient was not transferred the reason is recorded. If the patient has been transferred the receiving ICU is contacted to determine the patient's arrival time. The Sri Lankan ICU bed

availability system is an integral component of the Ministry of Health's critical care bed system which also includes the critical care clinical registry (MOH, 2013).

2.7.2 The National Health Service (NHS)

The London ambulance service provides an emergency bed service that helps National Health Service (NHS) professionals source hospital beds for seriously-ill patients (NHS, 2015). They provide advice on the availability of intensive care unit beds and notify hospitals and other organisations with casualty information during major incidents. They collect the information several times a day to determine ICU bed capacity. They then direct hospital-based clinicians to the nearest available ICU. In addition they coordinate the transfer of newborn babies between hospitals and provide information about service availability for mental health services.

The NHS have developed NHS pathways Dos (directory of services) for critical care services as part of a bed surge standard operating procedure development (NHS, 2013). This service provides adult critical care bed availability data for normal business and for escalation capacity purposes. The number of adult critical care beds available is submitted by hospitals six hourly, seven days a week, or as prescribed by strategic command arrangements. Levels of acuity beds available, levels of acuity of existing patients, levels 1 and 0 patients awaiting discharge, and levels of patients being treated outside of the critical care area are recorded. See Figure 2.3 for the bed state dataset. The NHS Pathways Dos was activated by the UK's national clinical director of critical care, in a real-life disastrous flooding situation (NHS, 2014). The system helped massively because it provided a quick overview of bed availability and located potential beds quickly to prepare for evacuation. Two nearby hospitals were immediately alerted to expect a patient at short notice. The bed state dataset set as seen in Figure 2.3 is provided in Table 1.

Table 1 Adult Critical Care Bed State Dataset

I.	Hospital name, unit name, unit level, speciality service
II.	Level 3 beds available empty and available
III.	Level 2 beds empty and available
IV.	Total beds on the unit
V.	Total of level 3 patients on the unit
VI.	Total of level 2 patients on the unit
VII.	Total of level 1 patients on the unit
VIII.	Level 3 patients outside of unit
IX.	Level 2 patients outside of unit
X.	Beds committed - to ensure beds remain available for expected incoming patients
XI.	Service notes – a free text box for any further information

NHS Pathways DoS – Adult Critical Care Bed State Dataset

Column 1: Unit name	
Definition	Name of the hospital, unit to include Intensive Care Unit (Level 3) / High Dependency Unit (Level 2), specialty if appropriate i.e. Neurology, (please avoid using acronyms in isolation). (*NHS Pathways DoS includes a prefix centrally to facilitate a geographical search)*
Rationale	Unique identifier and location for beds and patient activity being recorded
Column 2: Level 3 beds empty and available	
Definition	Number of Level 3 beds that are available to take a Level 3 patient immediately, subject to referral and Consultant to Consultant level acceptance, i.e. not booked or awaiting a discharge / delayed discharge.
Rationale	Shows available Level 3 capacity to facilitate patient transfer for clinical /non-clinical reasons and / or for planning and escalation.
Column 3: Level 2 beds empty and available	
Definition	Number of Level 2 beds that are available to take a Level 2 patient immediately, subject to referral and Consultant to Consultant level acceptance, i.e. not booked or awaiting a discharge / delayed discharge.
Rationale	Shows available Level 2 capacity to facilitate patient transfer for clinical /non-clinical reasons and/or for planning and escalation.
Column 4: Total Level 3 / Level 2 mix	
Definition	Total funded Level 3 / Level 2 beds on the unit
Rationale	Provides a baseline of bed capacity against which escalation and patient need can be compared
Column 5: Level 3 Patients on Unit	
Definition	Number of Level 3 patients on the unit
Rationale	To demonstrate acuity of patients in mixed units and to inform on acuity across Networks and regions (and nationally) in times of surge. Will support potential escalation locally. Aggregated it will support escalation regionally and nationally.
Column 6: Level 2 Patients on Unit	
Definition	Number of Level 2 patients on the unit
Rationale	To demonstrate acuity of patients in mixed units and to inform on acuity across Networks and regions (and nationally) in times of surge. Will support potential escalation locally. Aggregated it will support escalation regionally and nationally
Column 7: Level 1 / Level 0 Patients on Unit	
Definition	Number of Level 1 / Level 0 patients on the unit
Rationale	To show number of Level 1 / level 0 patients in units that are awaiting discharge from a Critical Care Unit and may indicate difficulty in accessing "patient step down" to appropriate ward level beds
Column 8: Level 3 Patients outside Unit	
Definition	The number of Level 3 patients being managed outside designated critical care beds (i.e. theatres, recovery, escalation areas). This is NOT to capture patients that have gone to theatre for surgery or to CT etc.
Rationale	To identify the potentially unmet patient need for critical care beds in i) normal working circumstances ii) in periods of surge. To support targeted escalation of response and/or support planning and commissioning of bed capacity
Column 9: Level 2 Patients outside Unit	
Definition	The number of Level 2 patients being managed outside designated critical care beds (i.e. theatres, recovery, escalation areas). This is NOT to capture patients that have gone to theatre for surgery or to CT etc
Rationale	To identify the potentially unmet patient need for critical care beds in i) normal working circumstances ii) in periods of surge. To support targeted escalation of response and/or support planning and commissioning of bed capacity.
Column 10: Beds Committed	
Definition	Total number of beds booked on the unit for any incoming patients, including repatriations.
Rationale	To ensure beds remain available for expected incoming patients.
Column 11: Service Notes	
	This is a 'free text' box that permits the use of any text to provide further information. Different Adult Critical Care Units and Critical Care Units use different 'local descriptions' to outline capacity.
Column 12: Function Buttons / Icons	

Figure 2.3 Adult critical care - bed state dataset

(NHS, 2013)

2.7.3 The National Neonatal Transport Programme

The National Neonatal Transport Programme was established in Ireland in 2001. It is a 24/7 high quality retrieval service for the stabilisation and transportation of sick neonates to regional neonatal/surgical intensive care units (NNTP, 2001). The doctor in the referring hospital can phone the NNTP directly and they will try to facilitate or assist with the location of the bed. The doctor can also go on-line and view the bed state information with a password-protected login. After the bed is sourced, a request for transport via the NNTP hotline is made. This call connects automatically to the relevant hospital on call. After the request to conduct the transfer is done, the referral form is filled out (See figure 2.4 below) and the retrieval team set out within forty minutes.

2.7.4 Canadian provincial ICU bed occupancy on-line dashboard

Due to the success of a regional, near real-time dashboard in five adult ICUs in Canada, a provincial dashboard has been developed (Shahpori et al., 2013). The dashboard indicates ICU bed occupancy by colour coded illustrations to show a below 80%, 80-88%, 88-100% or over 100% occupancy. Figure 2.4 shows the regional bed occupancy dashboard. The provincial system collects data from existing Admit, Discharge and Transfer (ADT) hospital data sources and benefits from using existing information technology (IT) infrastructure. There are four system requirements. Firstly, access to a hybrid of data repositories to obtain ADT data from 17 hospitals. Secondly, a local database to consolidate the ADT data. Thirdly, a business intelligence server to access the local database and present the data in a user-friendly format and finally, a method to present the dashboard graphical interface in an easy-to-access format Figure 2.5 provides the dashboard architecture. The bed occupancy indicator view is updated every hour and is displayed on the home page of the hospital's intranet. By placing the cursor over a bar, a tool-tip with demographics and contact information appears. Data content can be filtered to show the unit type or location specified by the user. A web form is also provided for automatically sending comments. Monthly and yearly historical bed occupancy views can be generated, and emails can be sent to regional directors when bed occupancy is at critical status.

The system can also simulate different occupancy scenarios and so allows administrators to simulate bed closures or expansions. The bed occupancy system was driven by the 2009 H1N1 pandemic and the need for not only valid triage instruments but also fast and reliable ICU occupancy information exchange (Shahpori et al., 2011, Shahpori et al., 2013). Capacity planning and control for any operation is setting the effective capacity of the operation so that it can respond to the demands placed upon it (Slack et al., 2001).

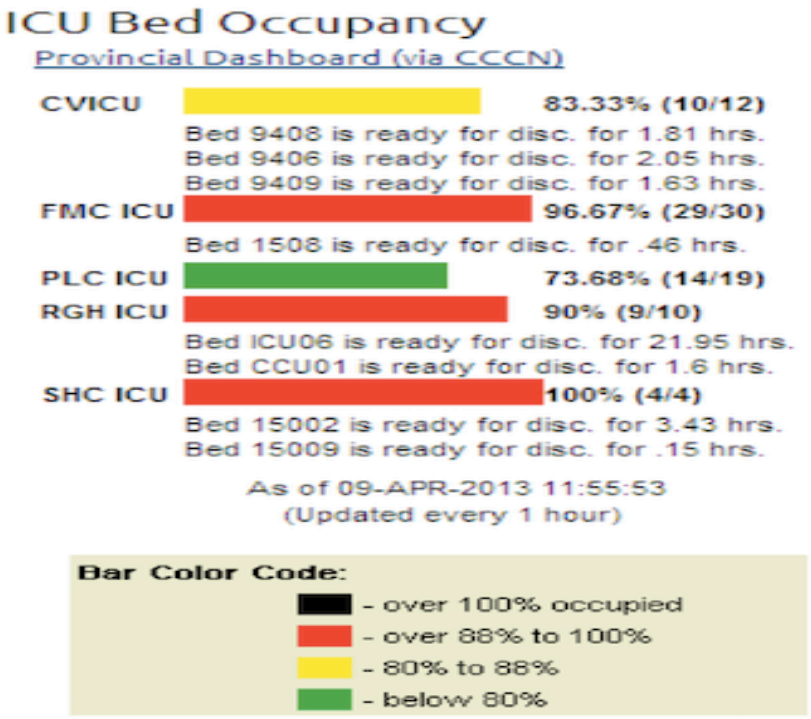

Figure 2.4 Regional ICU bed occupancy dashboard displaying time since been declared discharged

(Shahpori et al., 2013)

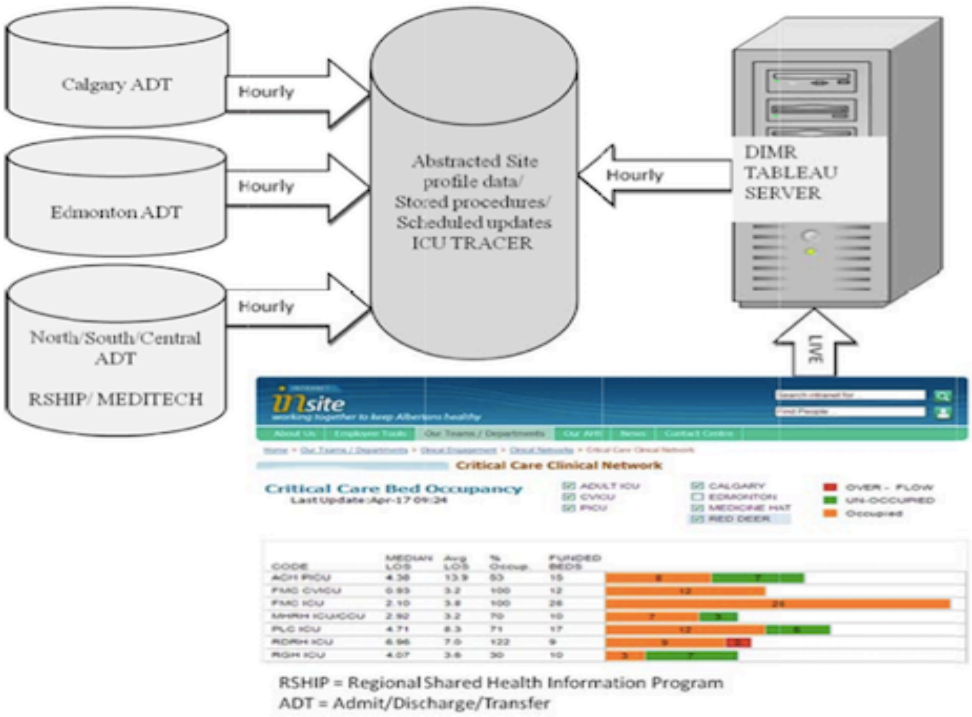

Figure 2.5 Regional ICU Dashboard architecture

(Shahpori et al., 2013)

2.7.5 Africa

During the 2010 South African World Cup a regional bed bureau was piloted so that emergency medical staff could direct ambulances to the hospitals with the required capacity (Jabar et al., 2012). The twelve designated hospitals in the Western Cape uploaded their bed status on-line where the information was accessible at the emergency medical centre's control centre. The only variable within the system was the bed count of ICU, maternity, paediatric, emergency department, medical, orthopaedic and surgical beds in the designated hospitals. This bed bureau can act as a valuable tool during a mass casualty incident by ensuring optimal use of all hospital beds by staff with login access and are involved in the management and updating of the system. The simple, shared real-time data collection and presentation interface can allow healthcare staff to make better, more informed decisions, regarding patient placements. This emergency database system is being developed to augment it's ability to quantify, survey and control limited resources during mass casualty incidents. Figure 2.6 provides a screenshot of the patient capacity overview page.

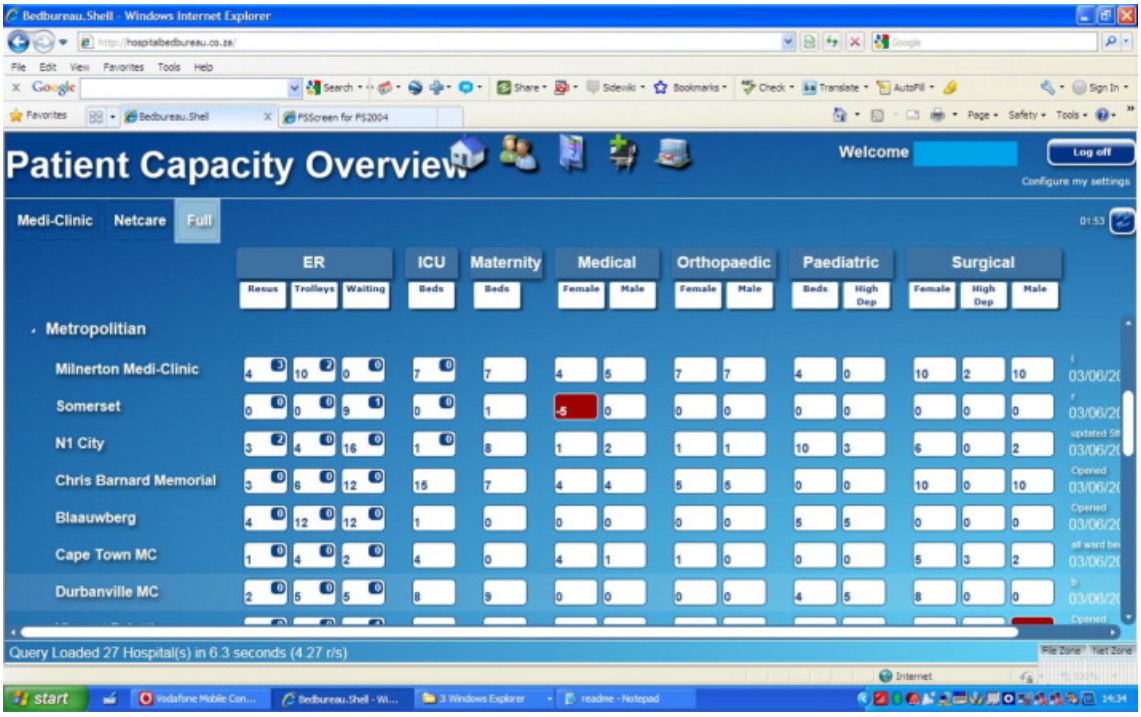

Figure 2.6 South African Patient Capacity Overview Screenshot
(Jabar et al., 2012)

2.7.6 Central bed management database evaluation

2.8 Conclusion

This chapter first looked in some detail at the ICU inter-hospital bed sourcing and referral processes, then it investigated shift leader information and communication needs surrounding the inter and intra hospital transfers. The chapter then explored how central bed management databases can facilitate timely bed sourcing utilising the bed availability function. Noteworthy aspects of the Sri Lankan, English, Irish, Canadian and South African databases are explained.

Chapter 3 Research Methodology

3.1 Introduction

This chapter discusses the rationale for the qualitative primary research methodology employed. The qualitative research strategy is explained including the mixed-mode strategy for collecting data using qualitative interviews and an open-ended on-line survey. Then the purposively chosen sampling method, the participant recruitment, interview guide and on-line questionnaire design are explained. Finally, the pilot study and ethical considerations are addressed.

3.1.1 Qualitative Research Strategy

The medical community, and especially the critical care community, increasingly realize the importance of qualitative data as a tool for improving patient outcomes (Rusinova et al., 2009). Qualitative research was used in this research study because it can detail processes and outcomes very well, can describe how a system works or fails, and can provide the groundwork for quantitative research (Strauss and Corbin, 1998). It comes from a naturalistic paradigm, is in-depth, emergent, builds upon natural ways of thinking and uses an emic approach to inquiry (Trochim, 2006 , Corbin and Strauss, 2008, Creswell, 2008, Richards, 2009).

Gaining an insight into the work practices and processes, where an information technology (IT) system will be used, is the first sociotechnical step to good patient care IT system design and implementation (Berg, 1999).

3.1.2 Mixed- mode strategy

To ensure an adequate sample representation, a tailored mixed- mode approach was used for the research. An in-depth qualitative face-to-face interview and an open-ended on-line questionnaire were chosen. A face-to-face interview was chosen instead of a distance interview because in-depth qualitative interviewing is one of the key naturalistic research methods and can allow access to a wide variety of participants, situations, experiences and opinions from participants with varying levels of professional experience (Rubin and Rubin, 2012). The open-ended on-line questionnaires validate the findings from the face-to-face interviews as triangulation of modes provides a balanced perspective and enhances the reliability of conclusions (Sarti et al., 2014).

3.1.3 On-line survey

An on-line survey was chosen because it can yield a higher response rate and a decreased response time compared to postal and face-to-face interview (Sproull, 1986). In addition, on-line surveys provide error-free computerised administration, are low in cost and are easily distributed (Rosenfeld et al., 1993, Gunn, 2002). Like self-administrated paper questionnaires, internet surveys allow for less social desirability compared with interviews, and so sensitive issues can be approached (Kreuter, 2008). The way people communicate today is changing and the researcher has adapted to this change as illustrated by the line of inquiry selected. There has been a cultural shift away from synchronous communication to a reliance on human intermediaries (Hampton and Wellman, 2003, Stern and Dillman, 2006) and participants today sometimes prefer a self-administered survey mode over a telephone survey mode (Smyth et al., 2010). For these reasons, and for validation purposes, this research study uses a mixed mode approach, mixing a qualitative interview with an on-line survey.

3.1.4 Other qualitative mode strategies considered

Qualitative observation was considered a very extravagant data collection method for this research study because an inter-hospital transfer does not occur on a regular basis, may occur in the middle of the night or at a time when the researcher is unavailable. The researcher in this study knows from experience that the processes involved in finding an ICU bed, referring an ICU patient, and coordinating both admission and discharge of an ICU patient can take many hours. Qualitative observation is known to be more time consuming and is often outside of the scope of fixed-time master's degrees (Bell, 2010).

Comparative ethnographic studies as described in Section 2.3.1 were undertaken over a period of six months. In addition, qualitative observation can be intrusive (Creswell, 2013b). It was anticipated that the presence of a novice observer would result in reactive effects due to the clinician's knowledge of being observed. Although, It has been observed that with time people being observed become accustomed (Creswell, 2013b) , even a small amount of time not focused on the acute critically ill patient was regarded as a potential risk to patient safety in this research study. Therefore, It was not feasible to carry out qualitative observation in this time-strict study because the processes requiring observation are already known to the researcher, are unpredictable, lengthy, and observation by a novice researcher may have potential negative effects on patient outcome.

Focus groups were ruled out of this study because it was decided that one-on-one, face-to-face interviews would yield the best information using a semi-structured interview guide. Participants in this study were not deemed hesitant to provide information. Face-to face interviews are used for interviewing participants who are articulate, can share ideas comfortably and who are not hesitant to speak (Creswell, 2008).

3.2 Site and Participant Sample selection strategy

The multi-site research locations were purposefully selected due to their relevance to the research problem and the ability of the researcher to gain access to them. The study was carried out in one recommended sub-regional spoke ICU, one recommended regional hub ICU and one recommended supra-regional hub ICU. The recommended group region was chosen due to the researcher being currently employed through a nursing agency to work as an intensive care nurse in this and other regions.

Participants for this research study were purposively sampled according to preselected criteria relevant to research. The purposive sample criteria for interviews and on-line survey included all anaesthetists, charge nurses and bed managers who have some experience, were actively involved with inter and intra hospital ICU transfers, and were employed at the purposively chosen sites. Exclusion criteria were those who worked outside of the inclusion criteria. Where there were large amounts of participants (Anaesthetists and nurses in regional ICU, and nurses in the supra-regional ICU) random sampling for interview was carried out and the remainder of the participants were asked to participate in the on-line survey. Random purposeful sampling adds credibility to a sample when the purposeful sample is too large (Creswell, 2013a).The participants were recruited through personal and professional networks where possible, and where not possible, a gatekeeper was sought.

3.3 Interview recruitment

The interviews and on-line surveys took place concurrently over a period of two months. The interviews took place in the manager's or consultant's office, a vacant conference room or wherever was convenient and quiet for the participants.

A comprehensive information sheet was e-mailed with the consent form, a minimum of one week in advance of the interview, giving the participant time to read and understand the information. See Appendix 8. All interview participants for the interviews were asked to sign a consent form before participating. Consent forms were sent by electronic mail (email) and confirmation of agreement to participate was received by email (Appendix 9).

The content of the interview discussions were accurately captured using a Dictaphone voice recorder and can demonstrate that all the information collected is a true portrayal of what was actually said. The participants were given an option not to be audio-recorded. One participant requested not to be audio-recorded. Afterwards this participant was e-mailed the written interview notes to confirm their accuracy. Then the participant telephoned additional information.

3.4 On-line survey recruitment

The same consent form and information sheet was used for the on-line survey. Each questionnaire was sent to the potential individual respondents utilising the on-line survey tool Survey Monkey. On-line potential respondents received the information sheet (Appendix 10) and consent form (Appendix 11) on the opening page of the survey and were given the option to exit the survey without submission. By proceeding to the survey the respondents gave their consent to participate. By using the reminder option in the survey monkey tool the researcher reminded potential respondents one week after the survey was sent. By implementing this option more respondents completed the on-line survey.

3.5 Interview guide design and questionnaire design

The literature review assisted with the question development for the interview guide and the on-line survey. An open-ended questionnaire to allow participants to comment freely beyond specific closed-ended questions was chosen to understand attitudes and behaviours in a timely manner (Creswell, 2008). In addition the on-line open-ended questionnaire allowed open-ended answers by many participants in a short space of time. Survey Monkey was the

specialised tool used to create the on-line survey. Survey Monkey creates on-line surveys easily (Schears, 2012).

Equivalent questions were designed and implemented for the on-line survey and for the qualitative interview guide questions. Dillman et al. (2009) advise the use of equivalent questions in a unified mode design, when possible, because differences in question wording and question format may pose problems for the research study (Dillman, 2009) .
Throughout the interview guide design stage the research study was cognizant of the researcher's own mental model because decisions made during interview design are shaped by a researcher's personal assumptions, experiences, values and beliefs (Collins and O'Cathain, 2009).

The researcher developed a semi-structured interview guide with clear instructions for complete coverage of the relevant topics (see Appendix 12, 13 and 14). By covering all the relevant topics, reliable and comparable data was collected. As the interviews progressed, the Interview guide design was refined by probing into certain experiences that had already being shared at previous interviews, in an iterative fashion. The interview guide was found to be crucial for this research study because at times discussions diverged whilst opening up conversations with interviewees.

3.6 Pilot study

A pilot study was conducted with the support from nursing, medical and bed managers outside of the purposively chosen sample. Two nurses, two anaesthetists and two bed managers were involved in the pre-test. The robustness of the interview guide and on-line questionnaire were examined by asking the pilot respondents to point out any questions that they felt were ambiguous, confusing or not in sequence. The pilot respondents were queried on consistent understanding of questions, their ability to answer questions easily and whether the questions established trust in the researcher or not. The on-line survey was assessed on cosmetic and format appearance and checks were made that everything worked well. Some questions caused confusion and were reworded (see Appendix 15 and 16). After the range of questions were discussed and revised, the interview guide and on-line survey were deemed suitable qualitative research tools to carry forward out into the field.

3.7 Ethical approval

An ethical application was submitted to the Trinity College Dublin (TCD) School of Computer Science and Statistics research ethics committee and approval was received (see Appendix 17) following a second application with a revision of nine issues. The researcher followed Trinity College Dublin's policy on good research practice (TCD, 2009).

The supra-regional hub hospital and the regional hub hospital ethical committee did not require ethical approval due to the study being considered a service improvement and did not involve patients (See Appendix 18). The spoke hospital required ethical approval correspondence (See Appendices 19, 20 and 21) and, after discussion at their bimonthly ethics committee meeting, ethical approval was granted, (see Appendix 22). The supra-regional hospital required approval from the nursing research access committee (NRAC). After NRAC application and discussion at the NRAC monthly meeting access to the ICU charge nurses was granted (see Appendix 23).

3.8 Data analysis

The researcher transcribed the interviews as soon as possible, critiqued the data, identified gaps in the information, and identified emerging themes, concepts and issues. Coding the data involved dissecting the data into codes, placing the codes under headings and ordering the data in a meaningful way. Coding is a useful data-handling tool to bring similar bits of data together to enable the researcher to see what is going on relatively easily (Grbich, 1999).

3.9 Conclusion:

This chapter has detailed the design, implementation and analysis of the research study and how the mixed modes assisted in answering the research questions. The results of the face-to-face interviews and on-line surveys are presented in the following chapter.

Chapter 4 Findings

4.1 Introduction

This chapter presents the participant response rate to the qualitative face-to-face in-depth interviews and open-ended on-line surveys. Thereafter, the qualitative themes that emerged from three intensive care units are presented.

4.2 Participant response rate

4.2.1 Anaesthetists

Five anaesthetists agreed to participate in the qualitative face-to-face interviews and one responded to the on-line survey. These participants were from the spoke and regional ICUs (Table 2 and Table 3). In total there was a near 80% response rate to the anaesthetic interviews and there was a near 7% response rate to the anaesthetic on-line survey (Figure 4.1, Table 3, Table 4).

4.2.2 Charge nurses

Eleven charge nurses participated in the face-to-face interviews and ten participated in the on-line survey, these participants were from all three ICUs (Table 2 and Table 3). There was a near 90% response to the charge nurse interviews and there was a near 44% charge nurse response rate to the on-line survey (Figure 4.1, Table 3, Table 4)

4.2.3 Bed managers

Three experienced bed managers participated in face-to-face interviews in this research study. They were purposively chosen as described in section 3.3 and all had over thirteen years of experience in the profession as seen in Table 2. There was a three out of 3 (100%) response rate from the purposively chosen bed managers (Figure 4.1, Table 4) Interview response

It was difficult to get all the people who had agreed to interview to find the time, therefore it was not possible to conduct all of the interviews as hoped. There was an overall response rate of 95% to the interview mode and an overall response rate of 30% to the on-line survey mode (Table 4).

Table 2 Interview Participant details

Sample	*Profession*	*Level*	*Interview in minutes*	*Experience in years*	*ICU level*
1	*Anaesthetist*	*Registrar*	*22:43*	*20*	*Spoke*
2	*Anaesthetist*	*Registrar*	*27:51*	*18*	*Spoke*
3	*Anaesthetist*	*Registrar*	*60:02*	*30*	*Spoke*
4	*Charge Nurse*	*Staff Nurse*	*37:40*	*5*	*Spoke*
5	*Charge Nurse*	*CNM 3*	*49:61*	*20*	*Spoke*
6	*Charge Nurse*	*Staff Nurse*	*44:44*	*15*	*Spoke*
7	*Charge Nurse*	*Staff Nurse*	*32:41*	*5*	*Spoke*
8	*Bed Manager*	*CNM 3*	*30*	*22*	*Spoke*
9	*Anaesthetist*	*Consultant*	*14:26*	*27*	*R Hub*
10	*Anaesthetist*	*SR*	*14:23*	*5.5*	*R Hub*
11	*Charge Nurse*	*CNM 3*	*22:43*	*12*	*R Hub*
12	*Charge Nurse*	*CNM 2*	*46:36*	*15*	*R Hub*
13	*Charge Nurse*	*CNM 2*	*60:26*	*13*	*R Hub*
14	*Charge Nurse*	*CNM 3*	*25:21*	*17*	*R Hub*
15	*Bed Manager*	*CNM 3*	*30:38*	*14*	*R Hub*
16	*Charge Nurse*	*CNM 2*	*28:55*	*9*	*SPR Hub*
17	*Charge nurse*	*CNM 2*	*13:50*	*10*	*SPR Hub*
18	*Charge nurse*	*CNM 2*	*30:23*	*10*	*SPR Hub*
19	*Bed manager*	*CNM 3*	*11:35*	*13*	*SPR Hub*

Table 3 On-line survey respondent details

Sample Number	Profession	Professional experience in years	ICU level
1	Anaesthetist	5	Regional hub
2	Charge Nurse	10	Sub-regional Spoke
3	Charge Nurse	3	Sub-regional Spoke
4	Charge Nurse	25	Sub-regional Spoke
5	Charge Nurse	6	Sub-regional Spoke
6	Charge Nurse	20	Sub-regional Spoke
7	Charge Nurse	18	Sub-regional Spoke
8	Charge Nurse	10	Sub-regional Spoke
9	Charge Nurse	1	Regional Hub
10	Charge Nurse	2	Regional Hub
11	Charge Nurse	9	Regional Hub

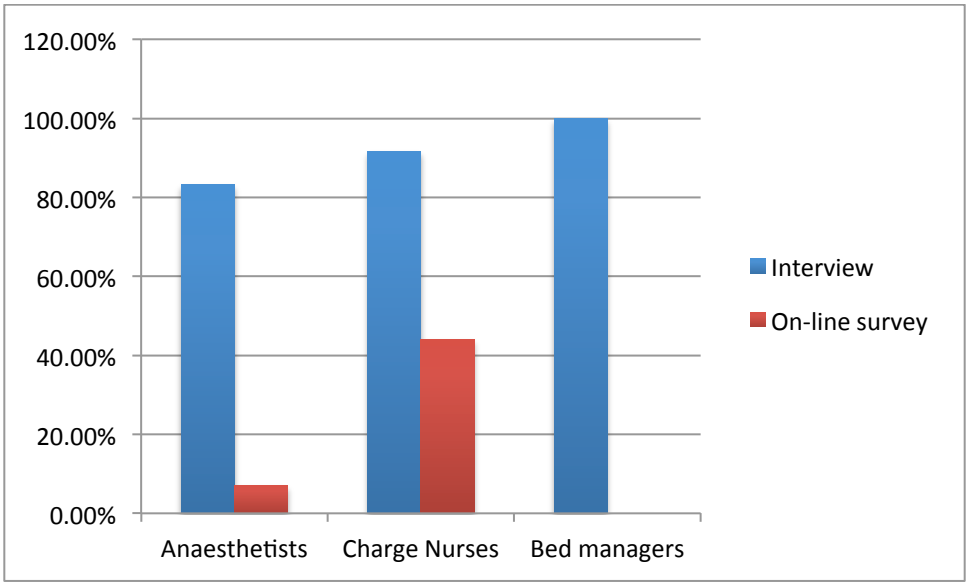

Figure 4.1 Interview and on-line response rate

Table 4 Individual hospital and professional group response rate

Profession	Professionals asked	On-line surveys sent	Participants interviewed	On-line responses	Interview participation	On-line survey participation
Anaesthetist spoke	3	0	3	0	100%	Not applicable
Anaesthetist regional	3	14	2	1	66.66%	7.14%
Charge Nurse Spoke	5	10	4	7	91.66%	70%
Charge Nurse regional	4	8	4	3	100%	37.5%
Charge Nurse SPR regional	3	5	3	0	100%	0%
Bed manager spoke	1	0	1	0	100%	Not applicable
Bed manager Regional	1	0	1	0	100%	Not applicable
Bed manager SPR Regional	1	0	1	0	100%	Not applicable
Total	20	37	19	11	95%	30%

4.3 Anaesthetists

4.3.1 ICU bed sourcing

Anaesthetists were asked: How do you source an ICU bed in another hospital's ICU when you have no ICU beds or appropriate treatment for the patient at your hospital?

Six themes emerged around how an ICU bed is sourced. Appendix 24 provides the interview excerpts from question 2. Appendix 25 provides the one on-line response to validate the interview findings.

Theme 1**: Special services and National services**

83% of anaesthetists (five out of 6) highlighted that if the patient needs a special treatment not available within hospital, for example dialysis, only the hospitals that do this treatment are contacted.

Theme 2: **Use of operating theatre facilities**

50% (three out of 6 anaesthetists) relayed that the spoke hospital only bring the patient to the OT as a last resort, if they are desperate. Due to manpower issues it is not feasible for the spoke ICU to routinely bring the patient to the OT.

Theme 3: **Far away ICUs**

Two out of the 6 (33%) (both from the spoke ICU)said that the spoke hospital often phones far away ICUs. The anaesthetist on call phones all the nearby ICUs for bed availability first. The spoke hospital phones locally, then phones further and then even further away.

Theme 4: Preference to stay in the city

Two out of the 6 (33%) (both from the regional hub ICU) noted that the regional hub hospital prefers to stay in the city and use the operating theatre (OT) to ventilate the patient until an ICU bed becomes available in the city. The regional hospital is reluctant to send a patient outside of the city to perhaps a different level of care. The regional hub hospital does not continue to ring around the country.

Theme 5: Sometimes primary team acceptance happens first, sometimes ICU bed availability is checked first. One out of the 6 (17%) explained that sometimes the relevant primary team must accept the patient in the receiving hospital first and then the anaesthetist on call in the sending ICU phones the receiving ICU and speaks with the anaesthetist on call there regarding bed availability. Sometimes it is done the other way around because the primary team may say that the patient primarily needs an ICU bed.

Theme 6: One out of 6 (17%) explained that when desperate the spoke hospital will do a swap

between ICUs, this entails exchanging a less critical patient with a patient who needs a higher level of care.

4.3.2 ICU inter-hospital referral

Anaesthetists were asked: What do you discuss with the receiving anaesthetist when referring an ICU patient to another hospital's ICU?

Eight themes emerged when asked what they discussed over the phone, Table 5 below presents the findings. Appendix 26 provides the interview excerpts.

Table 5 Anaesthetist phone discussion

I.	Presenting complaint
II.	Working diagnosis
III.	Patient history, background, co-morbidities
IV.	What has been done since admission
V.	What are the current patient treatments
VI.	What we feel is needed to be done
VII.	The need for a specialist or national service and the current bed situation in the sending hospital
VIII.	If the ICU is in a position to accept the patient a more detailed handover of all aspects of their care is given and a written account is given.

4.3.3 Issues surrounding ICU bed sourcing (Organisational and Information specific)

Anaesthetists were asked: What are the issues surrounding the ICU bed sourcing process?

Eleven themes emerged. Table 6 provides the phone call issues. Appendix 27 provides the interview excerpts.

Theme 1: It takes a lot of time to source an ICU bed.

83% (5 out of 6 anaesthetists) reported that the ICU bed sourcing is time consuming. The sixth respondent did not have direct experience with sourcing a bed in the current hospital.

Time-consuming issues are illustrated below from three of the anaesthetist's' own words:

> "*There is a time factor involved in calling inappropriate hospitals. It is like a lotto. Sometimes we call ten hospitals."*

> *"It takes a lot of time for me to call the reg, for the reg to call the consultant, the consultant has to come back, it's a long process."*

" *On call I'm supposed to look after all the patients in ICU and if I'm on the telephone for two hours, it is definitely going to affect the patient care. During that period of time my job is an operator, to ring all the hospitals just to look for a bed…it is a very time consuming and a very frustrating job…sometimes you could be lucky".*

Theme2: Very often it is a waste of time. As narrated by 3 out of the 6 (50%):

"more often than not it is a futile exercise"

"takes much time and effort, wastes time."

"*I have no problem talking with a doctor or a nurse for an hour, explaining the patient's condition knowing the patient is being transferred. My main problem is talking about the patient not knowing if the patient will get a bed there or not. It is a waste of time if you don't know if the patient will get a bed or not"*

Theme 3: The last ICU bed is guarded.

Two of the 6 (33%) -- an anaesthetist in the spoke ICU and one in the regional ICU mentioned the issue around the last ICU bed, as depicted from the following interview excerpts:

" …if someone has a massive bleed and the prognosis is really poor and if they have only one bed, they are reluctant. It is complex, indirectly they can say no because they know one bed would be taken over by someone who has a very poor prognosis."

"…people are guarding...every hospital is at near full capacity and if they are to fill their last bed with an external patient, it would want to be someone who actually needed to come."

Theme 4: More than one decision maker means more time on the phone and more time wasted. As explained in one anaesthetist's (17%) own words**:**

"It takes a lot of time for me to call the reg, for the reg to call the consultant, the consultant has to come back, it's a long process."

Theme 5:The time on the phone can affect the care to other patients. As expressed in an anaesthetist's own words (17%):

> *"On call I'm supposed to look after all the patients in ICU and if I'm on the telephone for two hours, it is definitely going to affect the patient care. During that period of time my job is an operator, to ring all the hospitals just to look for a bed…it is a very time consuming and a very frustrating job…sometimes you could be lucky".*

Theme 6: **It is a cause of frustration for the anaesthetist**

> *" During that period of time my job is an operator, to ring all the hospitals just to look for a bed…it is a very time consuming and a very frustrating job…sometimes you could be lucky".*

Theme 7: *2 of the 6 (33%) like the process to a game of luck, as analogized in their own words:*

> *"…sometimes you could be lucky."*
>
> *…it's like a lotto.."*

Theme 8: There are not enough beds every ICU is near full capacity

As described in two out of the 6 anaesthetists' (33%) own words:

> "*We could in any one case spend hours..it is a huge problem, because quite clearly there are not enough ICU beds for the demand so there is a continual problem every single week".*
>
> "*Because you are under pressure for ICU beds, you end up discharging patients to the ward and the wards are busy, really busy and understaffed and so you end up putting someone who probably doesn't need ICU but who shouldn't be on a ward as one of twelve patients that one nurse is looking after. So there are not enough step down facilities and not enough ICU beds."*

Theme 9: ICU beds are available for straightforward cases, however there is a longer travel distance.

As described by one out of 6 (17%) anaesthetist's own words:

> *"Getting a bed in the Dublin hospitals is always difficult, in the countryside we can usually find a bed but the distance is far...if a straightforward COAD patient needs ventilation".*

Theme 10: Transferring in the middle of the night is risky as one anaesthetist recounted:

> *"…In the middle of the night there are issues ...we can open recovery and leave the patient there until morning when you have many people, instead of very tired staff going on a trip with critical patients. We feel the risk…If the patient can wait - non-urgent, we shouldn't take the risk…"*

Theme 11: Early discharge from ICU is a concern for two anaesthetists, as narrated by one anaesthetist below:

> *"It is common that I would send out patients that I would prefer to hold for a little bit longer. We keep an eye on them but there is pressure and there are not enough beds for the patients and it is difficult to juggle that."*

Table 6 Phone call bed availability information collation issues

I.	It takes a lot of time
II.	It can waste time – sometimes futile
III.	Cause of frustration
IV.	Time on the phone can affect the care to the other patients
V.	Analogy to a game of luck

4.3.4 How to speed up the process?

Anaesthetists were asked: How do speed up the process?

Four themes emerged. The on-line anaesthetist skipped this question, see Appendix 28 or the on-line survey.

Theme 1: To speed up the process two out of 6 (33%) reported consultant colleague to consultant colleague direct contact. As illustrated from this short interview extract:

"It's personal, if I know a consultant I might ring him, because he knows me and he knows when I am desperate."

Theme 2: One out of 6 (17%) sometimes ask the nursing staff to help.

Theme 3: One out of 6 (17%) suggest hospital managers talking to each other as illustrated by this excerpt:

"Hospital managers talking to each other can speed things up. They make it easy. If we can't find a bed sometimes they can. How they do it, I don't know."

Theme 4: A centralised system

Rather than giving details on how the current process can be speeded up, 67% of anaesthetists (four out of 6) suggested a centralised system without being asked or when asked for additional comments, as described below from the respondent's own words:

"One centralised system where people know what the bed situation is in the whole country and the whole region…I then know for example there is no chance to get a bed in….that will help, that will save time."

"If there is a body, who knows the availability of the ICU beds and the appropriate hospital where the patient should go, it would make things very easy for us. Say we give you the information, then you can liaise or deliver it or guide us. Instead of calling inappropriate hospitals."

"There should be a central coordinator, who should know how many beds are free, and in what hospital, so I can contact them directly."

"If we knew without having to ring around where there was a bed that would save quite some time."

One out of the 6 (17%) in the regional ICU had no experience of the process in the past six months.

4.3.5 ICU inter-hospital accepting issues

Anaesthetists were asked: What are the issues surrounding the process to receive an ICU referral from another hospital? See Appendix 29 for the interview excerpts See Table 7 below.

The six emerged themes are outlined below.

Theme 1: 50% (3 out of 6 anaesthetists) reported that the process for receiving a patient is "*straightforward", "simple"* and *"easy".*

Theme 2: Sometimes the spoke hospital may have a bed but there are no nurses to cover that bed, as mentioned by one out of 6 respondents (17%).

Theme 3: Sometimes the information that comes with the patient may not be as detailed as they would wish. A standardised information template would help this issue.

As described in an anaesthetist's own words:

> " *…Sometimes the information that comes with the patient may not be as detailed as we would wish…sometimes it has to be done very quick so I understand…the ideal would be a standardised information template for all these critically ill patients, I think that would be easier, and an electronic one would be easier again so that the receiving hospital has it printed out and ready by the time the patient comes."*

Theme 4: Patients can be waiting in the spoke ICU for a specialist service in the hub ICU for days, and will hear about them several times. As described in one interview extract:

> "*We have a board where we put names of patients pending, they would be patients in different ICUs locally but need a specific primary care team here. We often don't have the option to accept them straight away. Usually we will hear about them several times. The ICU will be ringing us, it can go on for days".*

Theme 5: One anaesthetist out of 6 (17%) reported that the time between accepting a patient to the time of arrival to the regional ICU can be lengthy.

Theme 6: One of the 6 (17%) mentioned that patients can destabilise on a long journey.

Table 7 Accepting Issues

I.	Information may not be detailed enough
II.	Lenghty time between accepting and time of arrival
III.	Patients may destabilize on the journey
IV.	Hear about waitings in other hospitals several times
V.	May have a bed but no nurse

4.3.6 Strengths of the phone call

Anaesthetists were asked: In your opinion what are the strengths of the phone call (as opposed to written communication in this referral process? and what are the strengths of the phone calls (as opposed to a written communication) when receiving an ICU referral from another hospital?

Five strengths emerged, Appendix 30 provides the interview excerpts.

Theme 1: 67% (four out of 6 anaesthetists) felt that when receiving a patient they can ask questions to clarify things over the phone. The phone call was reported to be a two-way conversation useful for both sides.

Theme 2: 50% (Three out of the 6) said that when referring a patient it is easier by phone rather than in written form.

Theme 3: Two out of the 6 (33%) reported phone calls being immediate. As stated by one respondent:

> *"For example, if I text you now, you may not respond. With the phone call we are head to head…you get my point it is easier."*

Theme 4: Two out of the6 (33%)said that when referring a patient the anaesthetist can explain things better. In their own words:

> " *These people who are being transferred are very very sick, so sometimes it helps to talk to the person and let them know. You can give numbers but sometimes the numbers don't tell exactly what the patient's condition is. The numbers are different to the patient sometimes. The numbers don't always give a clear picture."*

"A written may not reflect what has happened at all so you get the opportunity for a fuller disclosure of what has gone on and what the patient situation is."

Theme 5: Two out of 6 anaesthetists (33%)stated that the receiving hospital can give advice over the phone. As stated by one interview:

"Sometimes we might be concerned if the patient is very unstable we might be able to talk to them about what they are currently doing in case we might be able to improve their stability for transfer…if the patient requires further treatment for the things we take in..".

4.3.7 Weaknesses of the phone call

Anaesthetists were asked: In your opinion what are the weaknesses of the phone call discussions (as opposed to a written communication) in this referral process? and what are the weaknesses of the phone call discussions (as opposed to a written referral) when receiving an ICU referral from another hospital?

Three themes emerged, see Appendix 31.

Theme 1: Two out of the 6anaesthetists (33%) said that sometimes you can't get hold of the person that you wish to speak with.

Theme 2: Two out of the 6 (33%) said that there is no record of what was said.

Theme 3: One out of the 6 (17%) reported that sometimes the person might not have all the patient details at hand.

4.3.8 Suggestions made regarding information exchange modes

Theme 1: The spoke hospital recommended preparing oneself for the phone referral and not to rely on memory.

As portrayed in this interview excerpt:

"*You should prepare yourself for talking on the phone. You should have your documents ready because people tend to forget, sometimes it can happen."*

Theme 2: Two out of 6 anaesthetists (33%); one from the regional and one from the spoke ICU felt that a good electronic system may be sufficient for relating relevant patient information.

Both respondents were experienced, one with twenty-seven years experience and one with eighteen years experience. As depicted in the two interview extracts below:

> *" It might be sufficient to transmit the information electronically. It would depend on the system. There may be some patients where it would be easier to communicate verbally, but it would depend on the system alternative available for relating relevant information."*

> *"…If there was a system in place where we will get all the information electronically…I will only contact them if I have concerns, otherwise I won't."*

Theme 3: 17% (1 out of 6) suggested a verbal and visual system for information exchange, as described in the respondent's own words:

> *"If there is a system like Skype where I can talk to him and he can see me and I can see him and he can see the patient, Yes, an electronic system like Skype would be easier."*

4.4 Charge Nurses

4.4.1 Charge nurse contacts for inter-hospital discharge

Charge nurses were asked: Whom do you contact to coordinate the ICU inter-hospital discharge transfer process?

Thirteen contact themes emerged , see Appendix 32 for the on-line responses to validate interview findings.

100% (twenty one out of 21 charge nurses) contact the following five personnel:

I. The accepting hospital
II. ICU charge nurse
III. Nurse looking after the patient
IV. The anaesthetist in the sending ICU
V. The primary team in the sending hospital
VI. The hospital on call for the mobile intensive care ambulance (MICAS)
VII. The national ambulance service (NAS).
VIII. 4 out of the 21 (19%) discuss nurse allocation with the nurses in the unit to ensure that they are happy to go and competent to go on the transfer, as depicted from this one interview excerpt:

> *"…if somebody is going from one ICU to another we try to have a senior nurse, like somebody with an ICU course and that might not be the nurse that is allocated so they*

might have to switch – hand that patient over to another nurse and they will take a different patient..”

Five out of 21 charge nurses (24%)

IX. Contact radiology and laboratory,
X. Inform the bed manager of the change in bed status
XI. Inform nursing administration of the change in bed status.
XII. Three out of the 21 (14%) report contacting the taxi service to bring the transporting nurse and anaesthetist back to the sending hospital.
XIII. One out of the 21 (5%) contact the infection control team regarding current infection status and the blood bank in case blood is needed for the transfer.

Charge nurses were asked: Can you describe what you discuss with each person when coordinating the ICU inter-hospital discharge transfer process? Nine discussion themes emerged (Table 8). Appendix 33 provides the on-line responses, to validate the interview findings.

Table 8 Charge nurse discussion surrounding inter-hospital discharge transfer

I.	Accepting ICU – to ensure the bed is available and ready
II.	Accepting ICU – to give a verbal account of the patient. Patient demographics, patient diagnosis, reason for transfer, accepting consultant, current patient status, a systematic handover on the patient's condition from head to toe, current infusions, current medications, ventilator settings and any specific patient needs are discussed. Infection control issues, need for isolation, bariatric patient needs or social issues are discussed.
III.	Accepting ICU - to give an estimated time of arrival and to ensure that the bed is not going to be given out to somebody else, the accepting ICU’s charge nurse is contacted when the patient is leaving.
IV.	MICAS - to discuss availability and timing, the MICAS hospital on call is contacted.
V.	The national transport service - If not a MICAS transfer and the availability, timing and needs of the patient and level of equipment is discussed.
VI.	The Anaesthetist- to check availability for transfer
VII.	Primary team - the patient’s discharge letter is discussed
VIII.	The Bed manager - just informed of the change in bed status by the charge nurse.
IX.	Radiology and laboratory departments - for the latest results

Charge nurses were asked: Whom do you contact to coordinate the admission of an ICU patient from another hospital's ICU**? Nine contact themes** emerged.

86% (eighteen out of 21) charge nurses contact the following three personnel: Nursing administration, the bed manager and their own anaesthetist.

100% (Eighteen out of the 21)100% contact the accepting team and the transferring ICU.

Six out of the 21 (29%) contact clerical staff for a medical record number, to admit the patient into the computer system or to print out patient labels.

Two out of the 21 (10%) contact their own nursing staff to get the bed space ready and

Two out of 21 charge nurses (10%) contact the dietician and physiotherapist to notify them of the patient transfer.

Charge nurses were asked: Can you describe what you discuss with each person to coordinate the admission transfer of an ICU patient from another hospital's ICU?

Six discussion themes emerged (Table 9).

Table 9 Charge nurse discussion surrounding inter-hospital admission

I.	The sending hospital -- patient status. Examples: are they ventilated, medications, special needs, infection control issues, need for an air mattress
II.	The sending ICU – bed availability and expected time of arrival
III.	Nursing administration around staff availability
IV.	The bed manager - to inform them that a patient is coming and to discuss whether a patient needs to be transferred out to receive the patient
V.	The anaesthetist - to confirm patient suitability, why the patient is coming and inform them of patient arrival
VI.	The primary team – to confirm that the patient has been accepted and to discuss the plan of care

4.4.1.1 Charge Nurse coordination of ICU intra-hospital discharge

Charge nurses were asked: Whom do you contact to coordinate the intra-hospital ICU discharge? and can you describe what you discuss with each person when coordinating the intra-hospital ICU discharge transfer?

Two out of 21 charge nurses (10%) skipped these questions on the on-line survey.

Eight contacts and discussion themes emerged from the rest of the respondents' answers:

62%(thirteen out of 21 charge nurses) contact the bed manager to discuss the need for a particular ward or isolation and bed availability.

62% (thirteen out of the 21) contact the charge nurse on the ward to discuss the patient's condition, all the details, time of transfer and the urgency of transfer. If they are full care or self-caring and if they are at risk of developing a pressure sore what is their Norton score. If they have special needs for example isolation precautions, a special, tracheostomy care, bi-level positive airway pressure (BIPAP) machine or naso-gastric feeding. As explained from one interview excerpt:

> "*You would go through the patient in detail, what brought them into you, their treatment, how they responded, how they are presently, their family and any needs they might have. Clarify with them who the accepting team is, what time you are planning on leaving, you would be going into a lot of detail about the patient. I suppose they were critically unwell, they warranted an admission to ICU, they were here for whatever period of time and now they are well enough to be discharged."*

Ten out of the 21 (48%) contact nursing administration if they need a special or to put pressure on the wards when the bed is needed. As demonstrated in a respondent's own words:

> *"Assistant directors of nursing (ADONs) will help put pressure on…there could be a blockage in trying to move the patients…that's when we say we need to put pressure on the ward, there is a lot of logistical manoeuvrings and people have to escalate up because otherwise you could spend all day on the phone-we're on break, we're busy, it will be a few hours and that's not acceptable."*

Four out of the 21 charge nurses (19%) contact the transfer attendant to discuss a time for transfer.

Two out of 21 charge nurses (10%) contact the team to notify them that the anaesthetist is discharging the patient. Three out of the 21 (14%) contact the anaesthetist to discuss discharging the patient from ICU. One out of the 21 (5%) notify the dietician to discuss ward orders. One out of the 21 (5%) notify the family of the transfer.

Table 10 provides the charge nurse discussions when coordinating the intra-hospital ICU discharge transfer, the discharge of an ICU patient who is now declared to go to the ward.

Table 10 Charge nurse discussion surrounding intra-hospital discharge

I.	Bed manager to discuss the need for a particular ward or isolation and bed availability.
II.	The charge nurse on the ward to discuss the patient's condition, all the details, time of transfer and the urgency of transfer. If they are full care or self- caring and if they are at risk of developing a pressure sore what is their Norton score. If they have special needs for example isolation precautions, a special, tracheostomy care, bi-level positive airway pressure (BIPAP) machine or naso-gastric feeding.
III.	Nursing administration if they need a special or to put pressure on the wards when the bed is needed
IV.	The transfer attendant to discuss a time for transfer.
V.	The team to notify them that the anaesthetist is discharging the patient.
VI.	The anaesthetist to discuss discharging the patient from ICU.
VII.	The dietician to discuss ward orders.
VIII.	The family of the transfer

4.4.2 Charge Nurse information needs

Participants were asked: At 9am you have an ICU patient who has been accepted by another hospital's ICU, you need to coordinate the inter-hospital ICU transfer process. What are your information needs to coordinate this inter-hospital ICU discharge transfer process?

Eighteen basic themes emerged around the information needs for the charge nurse to coordinate this inter-hospital ICU discharge. See Figure 4.3, Appendix 34 provides the interview excerpts. below for the basic themes clustered into four organising themes to constitute the global theme of charge nurse information needs for an inter-hospital ICU discharge.

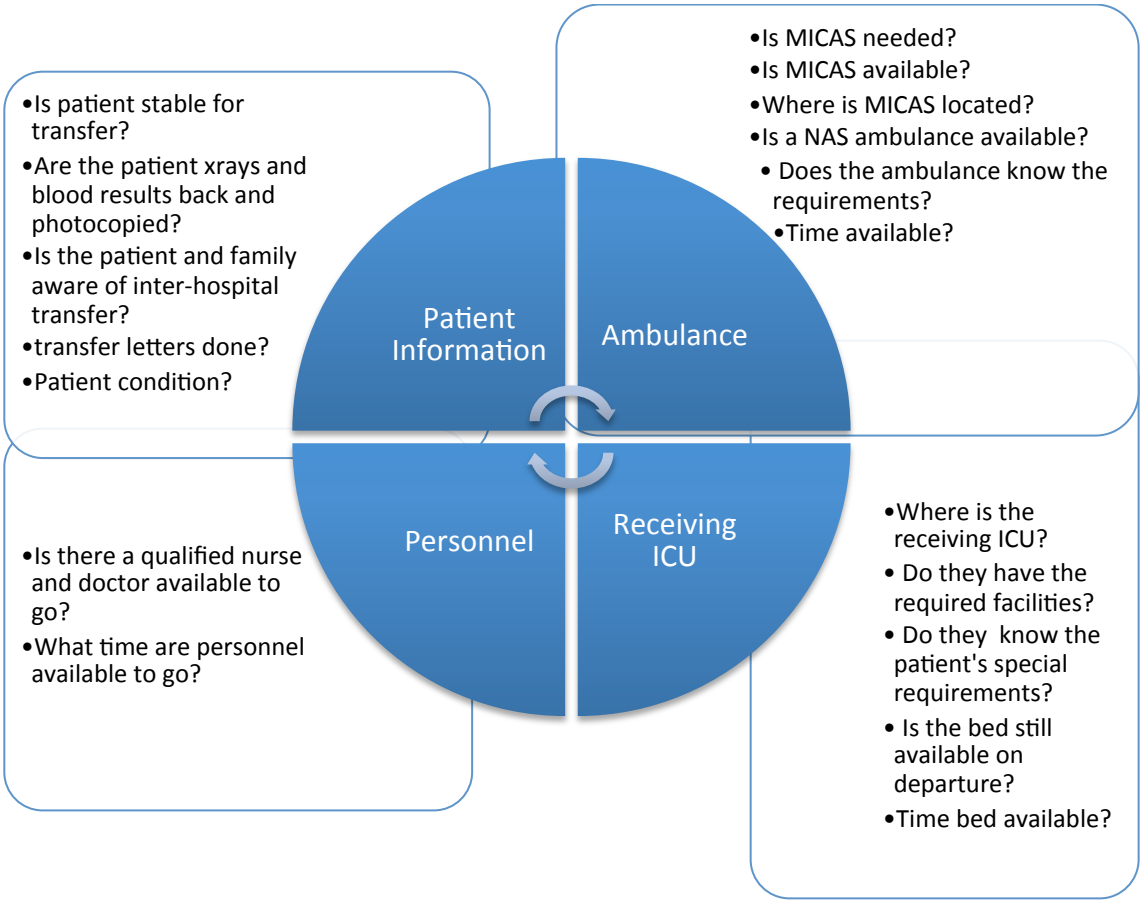

Figure 4.2 Charge nurse information needs surrounding IHT discharge

Charge nurses were asked: At 9am you need to accept an ICU admission transfer from another hospital's ICU, what are your information needs to coordinate/facilitate this inter-hospital ICU admission transfer process?

Twenty-one themes emerged around the accepting charge nurse's information needs/questions, as provided in Table 11 below. Appendix 35 provides the interview excerpts.

Table 11 Accepting Charge Nurses' information needs

I.	What is the need for transfer?
II.	Are there any other sick patients in the ED who may need the ICU bed first?
III.	How urgent is the transfer?
IV.	What are the patient history and details?
V.	What is the current patient status?
VI.	What time is the patient due to arrive?
VII.	Are there any infection control issues?
VIII.	If in a road traffic accident (RTA) are their spines cleared?
IX.	Are there any special precautions, for example spinal precautions?
X.	Has the patient been accepted by a primary team/consultant ?
XI.	If the patient is for surgery when is the surgery?
XII.	Does the patient need specialist treatments, for example dialysis?
XIII.	Are there any other plans for the patient?
XIV.	What current treatments is the patient on?
XV.	What is the patient's haemoglobin (HB)?
XVI.	Is the patient on any unusual medications, total parenteral nutrition (TPN) or naso-gastric (NG) feeding regimens?
XVII.	Are there any special needs, for example tracheostomy or special mattress?
XVIII.	Is there a nurse to take the patient?
XIX.	Was the patient a previous patient of this hospital?
XX.	What lines do they have in place?
XXI.	What about the family?

Charge nurses were asked: An ICU patient needs to be discharged to a step-down unit or ward when another ICU patient needs admission to that bed. What are your information needs to coordinate the intra-hospital ICU discharge process?

Eight themes emerged around the charge nurse's information needs for an intra-hospital discharge. As presented in Table 12 below, Appendix 36 provides the interview excerpts.

Table 12 Charge Nurse Information needs for intra-hospital discharge

I.	How speedily does the transfer need to be done?
II.	What is the patient status and dependency level?
III.	What appropriate ward should the patient go to?
IV.	Is there a bed available?
V.	Where is the bed available?
VI.	If the patient is infected and there are no isolation rooms, can the patient go to a six-bedded area by the sink?
VII.	Does the patient need a speciality ward or coronary care unit (CCU)?
VIII.	When will the bed be ready on the ward?
IX.	Will there be a delay getting the bed?
X.	Can admissions speed up the process for you?

4.4.3 Issues surrounding ICU discharge coordination

Charge Nurses were asked:

In your opinion what are the issues surrounding the ICU inter-hospital discharge transfer coordination process? and, at 6pm you need to discharge transfer an ICU patient to another hospital's ICU, how does the coordination/facilitation process differ at this time?

Twenty issue themes emerged surrounding ICU inter-hospital discharge transfer and **seven** more issues emerged after 6 pm. See Table 13 and Table 14. Appendix 37 provides some interview excerpts.

Table 13 Issues surrounding the ICU inter-hospital discharge transfer

I.	The Lack of ICU beds resources cause transfer delays.
II.	Mobile intensive care ambulance (MICAS) only operates office hours.
III.	MICAS may be available but there may be no nurse available in the on call hospital.
IV.	National ambulance trolley is risky and dangerous for spoke and regional hospital patients.
V.	The supra-regional hospital has their own trolley but there are still issues around getting the right ambulance.
VI.	Not all ambulance service providers understand what facilities are needed for an ICU transfer.
VII.	Difficulty with bariatric patients fitting into the ambulance.
VIII.	Delays in getting a NAS ambulance –while waiting the bed may go.
IX.	While the patient is being transferred the bed can go inadvertently.
X.	The patient can become too unstable to transfer once moved onto the ambulance trolley then the patient and the sending ICU are delaying the transfer.
XI.	Charge nurse distracted from coordinating the care of the other patients.
XII.	A lot of time wasting trying to get to speak with the right person on the phone.
XIII.	No secretarial services for photocopying patient notes.
XIV.	The ICU is short staffed when the nurse and doctor need to escort the patient to the receiving ICU.
XV.	Nurse and doctor need to carry back the ventilator, pumps and monitor from the destination ICU into a taxi.
XVI.	The taxi back is expensive.
XVII.	Sometimes staff are late getting off duty after a transfer, have to make domestic arrangements and need to be owed hours due to being late off duty.
XVIII.	Appropriateness of the ICU admission – sometimes questionable.
XIX.	Social problems and alcoholism are draining the ICU resources and dictating the bed availability in the regional hospital.
XX.	Trauma patients are deteriorating in peripheral hospitals due to a delay in being transferred to and getting optimal specialist care.

Table 14 Extra Issues surrounding the inter-hospital discharge coordination after 6 pm

I.	There is no MICAS service.
II.	There are traffic issues.
III.	There are less staff at night
IV.	Staff are more tired at the end of a shift.
V.	Senior management back up is not available in hospital.
VI.	Two handovers if it is at change of shift time therefore some information can get lost.
VII.	Not nice for patients to be repatriated after 6pm.

Charge nurses were asked: In your opinion what are the issues surrounding this ICU admission transfer from another hospital process?

Eleven admission Issue themes emerged. See Table 15 below. See Appendix 38 for interview excerpts.

Table 15 Issues surrounding the ICU inter-hospital admission

I.	Not being informed that a patient had an infection - spoke ICU.
II.	Families not wanting the patient to be transferred due to extra travel time-spoke ICU.
III.	Clerical issues - trying to get the patient admitted and get a hospital number out of hours, can delay patient care - spoke ICU.
IV.	Medical or surgical teams not giving a clear plan of care on patient arrival - spoke ICU.
V.	Inadequate nursing handover at times - spoke ICU.
VI.	No nurse with patient on transfer at times - regional ICU.
VII.	Possibly two hours without documentation on admission due to a delay in getting patient onto the computer system on admission out of hours - regional ICU.
VIII.	Too many people organising the admission resulting in unclear communication pathways - regional ICU.
IX.	Patients have been repatriated unannounced at times - regional ICU.
X.	Overextending the services, running at 110% capacity - supra-regional ICU.
XI.	Sometimes difference of opinion regarding current treatment between sending and receiving doctors regarding current treatment - supra-regional ICU.
XII.	When too many people are involved the estimated time of arrival then becomes unclear - supra regional ICU
XIII.	Unable to hold the ICU bed sometimes due to an in hospital emergency.

Charge nurses were asked: In your opinion, what are the issues surrounding this intra-hospital ICU discharge coordination process? **Twelve Issue themes** emerged. Table 16 presents the emerged issues. Appendix 39 provides the interview excerpts.

Table 16 Issues surrounding the ICU Intra- Hospital Discharge

I.	Bed availability.
II.	Could be waiting six hours for a bed on the ward to be ready.
III.	Bed could be empty but ward nurse is too busy to accept the patient.
IV.	Beds on the wards are prioritised for the ED.
V.	Transfers are not always done early in the day when the patients have been discharged and sometimes patients are discharged later in the day when there is an emergency – there may be less staff on then. Therefore a planned discharge is better than an emergency one.
VI.	Sometimes there is a difference of opinion between the Anaesthetist and the primary team regarding discharge.
VII.	Lack of air mattresses on the ward can causes a delay in some ICU discharges.
VIII.	There can be cleaning delays on the ward.
IX.	Early discharge from ICU to facilitate an admission can cause ICU readmissions.
X.	Patients may be discharged from ICU in the morning but their condition may change, bed management find this frustrating.
XI.	Not good psychologically for the patient to stay in ICU for a protracted length of time.
XII.	Delays mean a patient could be waiting in resus in the ED for hours

4.4.4 How to speed up the process

Charge nurses were asked: how do you speed up the inter-hospital ICU discharge process? **Six themes** emerged. Table17 presents the emerged themes, Appendix 40 provides interview excerpts.

Table 17 Suggestions to accelerate the Inter-Hospital Discharge

I.	Have all the patient information ready – blood results and other results photocopied.
II.	Advise consultant-to-consultant discussion – in the spoke ICU.
III.	Call on the general manager – in the spoke ICU.
IV.	Clarify the urgency.
V.	Have paper work complete for 2 handovers- one over the phone to the nurse in the receiving hospital and one to the MICAS nurse.
VI.	The speed of getting the bed is out the nurse's control.

Charge nurses were asked: How do you speed up the inter-hospital ICU admission process?

Four themes emerged Table 18 presents the emerged themes, Appendix 41 provides the interview excerpts.

Table 18 Suggestions to accelerate the Intra-Hospital Admission

I.	Actively make the bed available for the patient, this involves liaising with bed management to create a bed and discharge an ICU patient that is ready to go to the ward.
II.	Liaise with everybody involved and linking back in with them– nursing staff, manager of unit, consultant and accepting team.
III.	ICU discharge planning.
IV.	Three interviewees said that if the bed is available there is no delay issue on their side.

Charge nurses were asked: How do you speed up the intra-hospital ICU discharge to the ward process? **Nine themes** emerged: Table 19 presents the findings, Appendix 42 provides the interview excerpts.

Table 19 Suggestions to accelerate the intra-Hospital Discharge

I.	Verbalise concerns at the morning discharge hub meeting. - In the spoke ICU.
II.	Discussions with the ward and keep the lines of communication open.
III.	Aim to speak with the ward manager so that information does not get diluted.
IV.	Discuss face-to-face with the ward to better understand where they are coming from.
V.	Escalate to the ADONs -in the regional hospital.
VI.	Utilise the patient flow manager - in the supra-regional hospital.
VII.	Giving the admissions/bed manager a list every morning, of the patients for discharge and their special requirements – in the supra-regional hospital.
VIII.	Repeat the phone-call.
IX.	Relay the urgency.

4.4.5 Strengths of the phone call

Charge nurses were asked: In your opinion what are the strengths of the phone calls (as opposed to written communication) in (A) this inter-hospital ICU discharge transfer coordination process? (B) This inter-hospital ICU admission process? And (C) this intra-hospital ICU discharge coordination process?

(A) **Eighteen basic themes** emerged, Table 20 presents the emerged themes, Appendix 43 provides interview excerpts.

Table 20 Inter-Hospital Discharge phone call strenghts

I.	Minor issues can be discussed.
II.	You have a named person to speak to and to deliver the information to – the person who will be looking after the patient.
III.	Any issues can be ironed out there and then.
IV.	Phone calls are quicker.
V.	Phone calls can clarify.
VI.	Over the phone you pick up nursing instincts.
VII.	Over the phone you can say what the family are like – little things make the transfer easier.
VIII.	Can discuss pressure areas and signs and symptoms better.
IX.	A combination of communication modes is good but the phone call allows for a feel of the activity of the other unit.
X.	Nurses are not good at typing – takes longer and could be spelt wrong.
XI.	Phone is more accurate and up-to-date.
XII.	There are things that you don't think about until you are talking.
XIII.	People pay more attention to a voice on the phone.
XIV.	People remember voices – who said what.
XV.	You know that your information has been delivered by phone
XVI.	You can leverage a bit of priority over the phone.
XVII.	You make a personal link with the receiving CNM.
XVIII.	It is easier to explain and easier to understand over the phone.
XIX.	Can pick up information from the tone of voice.
XX.	Face-to-face is the ultimate.

(B) **Fourteen basic themes**, Table 21 presents the emerged themes, Appendix 44 provides interview excerpts.

Table 21 Inter-Hospital Admission phone call strenghts

I.	Easier.
II.	Depends on the quality of the information and the quality of the person making the phone call.
III.	Quicker.
IV.	To ring before leaving with an ETA is very useful – nurses are not good at looking at emails. If there were an email or texting warning system in a timely manner it might be OK, a one-system bleep would be easier.
V.	Phone calls are on the spot and real-time.
VI.	Get a better understanding.
VII.	When you look at the patient you can tell more about them rather than reading something.
VIII.	Both are liked.
IX.	Queries are answered directly.
X.	They can tell you about the family.
XI.	People feel secure with the phone call
XII.	When patients arrive like to get a visual of them but not beforehand unless they have an unusual wound or rash.
XIII.	Get a clearer picture of the patient when speaking nurse to nurse, doctors have a different perspective
XIV.	To talk with the person who is with the patient is crucial.

(C) **Four basic themes** emerged: Table 22 presents the emerged themes, Appendix 45 provides interview excerpts.

Table 22 Intra-Hospital Discharge phone call strenghts

I.	In hospital it makes sense to make a call from a colleaugeality point of view
II.	Can explain to the ward that there is a patient in A+E urgently waiting for the bed.
III.	Can put pressure on the ward.
IV.	Human contact has a lot to offer.

4.4.6 Weaknesses of the phone call

Charge nurses were asked: In your opinion what are the weaknesses of the phone calls (as opposed to written communication in (A) this inter-hospital ICU discharge transfer coordination process? in (B) this inter-hospital ICU admission process? And in (C) this intra-hospital ICU discharge coordination process?

(A) **Ten basic themes** emerged. Table 23 presents the emerged themes, Appendix 46 provides the interview excerpts

Table 23 Inter-Hospital Discharge phone call weaknesses

I.	From a legality point of view, if mistakes are made it is one person's word against another – no personal experience of this happening though
II.	Getting through to the unit is a problem- no direct lines. Unit to unit speed dial would be helpful.
III.	Trying to get the person that you want to talk with is timely.
IV.	What is said over the phone can be perceived differently, if written you have a paper trail- no personal experience with this though.
V.	Both are really important.
VI.	With clear documentation the receiving person can look over it again.
VII.	No proof that the call was made.
VIII.	Depends on the integrity of the person receiving the information and of the person making the call as to what information they say was sent.
IX.	Depends on the person who is receiving the calls for passing that information further on.
X.	Have the details at hand while talking on the phone.

(B) **Seven themes** emerged. Table 24 presents the emerged themes, Appendix 47 provides interview excerpts

Table 24 Inter- Hospital Admission phone call weaknesses

I.	It depends on who is delivering the information
II.	There is no proof.
III.	Sometimes you don't get a phone handover from the nurse looking after the patient – spoke hospital.
IV.	Something may not be heard over the phone.
V.	Verbal comes first, written comes afterwards.
VI.	Can miss the spoken word if stressed or get a lot of information.
VII.	Information regarding official radiology reports can be lacking.

Five themes emerged. Table 25 presents the emerged themes, Appendix 48 provides interview excerpts

Table 25 Intra-Hospital Discharge phone call weaknesses

I.	It is time consuming – can be left ringing or takes a number of calls.
II.	No record of what was said.
III.	Nurses on the wards may feel harassed if more than one person is in control of the ringing.
IV.	Could potentially need to repeat yourself if there is a change of shift.
V.	How things are said under pressure may get some people a little bit upset- a telephone conversation can get heated whereas a written will not.

4.4.7 Bed manager involvement with the ICU inter-hospital transfer

Bed managers were asked: Do you source or coordinate/facilitate any part of the ICU inter-hospital transfer process? See appendix 11 for the bed manager interview guide.

100% (3 out of the 3)reported having no involvement in the coordination of ICU inter-hospital transfers. The hospital bed managers are informed as to who is required to go in and who can come out of the ICU but it is the anaesthetist who coordinates the ICU inter-hospital transfer. One out of the 3 (33%) mentioned the trolley Gar status report - where all hospitals report their numbers at eight am, two pm and eight pm. senior administration write the report and they can identify beds, an ICU bed is visible on this report if available.

4.4.7.1 Bed manager information needs for intra-hospital patient transfer

Bed managers were asked: What are your information needs to coordinate/facilitate the intra-hospital ICU discharge process when an ICU patient needs to be discharged to a step-down unit or ward when another ICU patient needs admission to that bed?

Thirteen basic information need themes emerged from the interviews. Appendix 49 provides interview excerpts.

Two out of 3 participants (67%) voiced:

I. Patient's name
II. Diagnosis
III. Patient's primary consultant
IV. Is the patient confused? If so the patient may need a special to sit with the patient.
V. Is the patient at risk of suicide? If so a ground floor bed is needed.

Three out of 3 participants (100%) voiced special requirements such as:

VI Are there infection control issues? Is an isolation room needed? Can a patient cohort be organised?

VII Does the patient have a tracheostomy? Because not all the wards have the ability to take care of them in one hospital and they may need a single room for space in another hospital.

One out of 3 participants (33%) voiced:

VIII Whether the patient is a medical or surgical patient

IX The need to know if the patient is on a trilogy or a Bi-level positive airway pressure (BIPAP) machine because only the respiratory ward can look after these patients.

X The need to know if the patient is palliative because they may need a single room.

XI The need to know if the patient is public or private and how sick they are for patient safety, as described in the respondents own words:

" Sometimes if patients are private they are not often suitable for a single private room, so you would have to discuss. If they are very sick, they might need to be in a six or four bedded area on a semi-private ward rather than in a single room because they may be too far away from the nurses station…sometimes some of the rooms are too far away from the nurses station and if they need constant observation they would need to be by the nurses station where they are safer."

XI The need to know if the patient is on a bariatric bed as illustrated in this interview excerpt:

"If the patient needs a bariatric bed, some of them don't fit in some of the wards, so you need to get a single room for those patients even though they don't need isolation."

XII The need to know prisoners' special requirements. As depicted in the respondents own words:

"…You could run into issues where you have prisoners and prison officers with them. So they are better off in a single room because otherwise you may have three people blocking up a six bedded area…they are all the kind of things that you take into consideration."

4.5 Bed manager contacts

Bed managers were asked: Whom do you contact to coordinate/facilitate the intra-hospital ICU discharge? and can you describe what you discuss with each person when coordinating the intra-hospital ICU discharge transfer?

100%(three out of 3) coordinate with the clinical nurse manager (CNM) in the ICU, the CNM in the ward and at times nursing administration. All fourteen themes in section 4.4.7.1. are

discussed as needed including three basic themes. A brief handover is given because ICU staff liaise with ward staff and give a detailed handover to the nurse who is directly responsible for the patient. The possible need to go to a step down unit is discussed, as is an approximate timeframe for patient transfer out of ICU.

4.6 Bed manager issues around inter-hospital transfer

Bed managers were asked: In your opinion, what are the issues surrounding this intra-hospital ICU discharge coordination process?

Thirteen basic themes emerged around delays in intra-hospital transfers. Table 26 presents the emerged themes, Appendix 50 provides interview excerpts

Table 26 Bed Manager Issues Surrounding intra-hospital transfer

I	No beds being available.
II	An increase in demands on the services.
III	Ward rounds delays.
IV	Sometimes the message getting to the bed manager can be delayed.
V	Sometimes ICU are delayed moving the patient out,
VI	Diagnostic procedures delays can cause discharge home delays.
VII	Terminal cleaning can cause a delay.
VIII	Delays due to ringing infection control to clarify do the patients in isolation still need isolation.
IX	There are delays due to nursing shortages or special shortages.
X	Getting the appropriate ICU patients out to the appropriate wards
XI	Trying to get an isolation room as a main concern because the single rooms are always blocked up
XII	Not knowing if an OT patient needs an ICU until later in the day can cause delays.
XIII	Waiting for medical patients to be discharged elsewhere can be delayed while waiting for an ambulance.

Getting the appropriate ICU patients out to the appropriate wards can be an issue, as explained in this interview excerpt:

> *"If you have a urology patient who had a cystectomy they really need to go to a urology ward…sometimes on nights the night nursing administration may not have a choice and may put the patient on a general surgical ward instead of a urology ward and that's not good for the patient's recovery…then what we try to do is move them the next day."*

One out of 3 bed managers (33%) report:

XI Trying to get an isolation room as a main concern because the single rooms are always blocked up. As narrated in the respondent's own words:

"…To make a single room you might have to move three patients…and if someone who has been infected has been in there for months previously they have to get it deep cleaned."

XII Not knowing if an OT patient needs an ICU until later in the day can cause delays. As related in the respondent's own words:

"Patients who are scheduled to go in…we often don't know until much later in the day…that they are definitely going to require a bed. The early head up…gives us the insight to know what beds we are going to have around the wards…if we are making beds for the unit are those patients definitely going into them, can I go ahead now and use those beds at ward level, we're constantly trying to look at the bigger picture rather than just the ICU units."

XIII Waiting for medical patients to be discharged elsewhere can be delayed while waiting for an ambulance. In the respondent's own words:

"On the medical wards often the patients that are being discharged are confused or for long term care so you could be waiting on an ambulance and they are not suitable for the discharge lounge…if it's a public ambulance it can cause delays for hours and hours…if it is causing a major delay in getting a patient out from a ward you could ring the private ambulance to get the patient out just to facilitate the ICU patient."

4.6.1 How to speed up the process

Participants were asked: What do you do to speed up this intra-hospital ICU discharge coordination process? **Seven themes emerged**. Table 27 presents the emerged themes.

Table 27 How to accelerate the intra-hospital discharge

I	Timely communication from ICU regarding the need for a bed on the ward.
II	Explaining the urgency and putting pressure on the wards to take the patient quicker by repeat phone calling can help.
III	Encouraging prompt ward rounds.
IV	Discussions at the bed manger meeting.
V	The patient flow manager can transfer patient A from B as quick as is possible
VI	The morning email from ICU regarding discharged patients' special needs.
VII	Phoning the ICU in the morning before the rounds to see if the CNM felt there might be someone that could move out later.

Explaining the urgency and putting pressure on the wards to take the patient quicker by repeat phone calling can help. As described in a bed manager's own words:

"You need to communicate especially if there is an emergency in ED and explain that this is a matter of urgency and you need to prioritise getting this bed ready by moving somebody elsewhere…if I'm just moving somebody out and there is nobody lined up for that bed, I wouldn't put as much pressure on them to move the patient as quickly but obviously if there is somebody down in ED who needs the bed straight away you would put more pressure on them…if you explain that the patient is really sick, I need to move them up urgently, can you work on this?...it just puts extra pressure when they hear that from you themselves."

"If there is somebody in ED or something on an unplanned basis where somebody has arrested on a ward, you would always try to push the case, they desperately need to get up there…we'd have frequent dialogue with the nurse in charge of ICU who is coordinating the patients in and out."

One out of 3 bed managers (33%) explained the following could help speed up the intra-hospital ICU discharge process:

VIII Encouraging prompt ward rounds.
IX Discussions at the bed manger meeting.
X The patient flow manager can transfer patient A from B as quick as is possible
XI The morning email from ICU regarding discharged patients' special needs.
XII Phoning the ICU in the morning before the rounds to see if the CNM felt there might be someone that could move out later.

4.6.2 Strengths of the phone call

Bed managers were asked: In your opinion what are the strengths of the phone calls (as opposed to written communication) in this intra-hospital ICU discharge coordination process?

Three themes emerged. Table 28 presents the emerged themes.

Table 28 Strenghts of the phone call

The calls are necessary for urgent admissions needing real-time information
You get a better feeling for a sick patient over the phone
The phone call is only as good as how up-to-date the information is

I The calls were deemed necessary for urgent admissions needing real-time information. As revealed in one out of 3 respondent's (33%) own words:

"The calls are really required for ad hoc urgent admissions…it does need to be done in real-time and telephones are often the best way of doing that."

II Another respondent out of 3 (33%) reported getting a better feeling for a sick patient over the phone. As shown by this interview extraction:

"For the likes of moving a patient out of ICU, in that the patients are quite sick, you are probably able to get a better feeling as to how sick the patient is…you might tick off the boxes, but sometimes you need that extra personal touch to give the appropriate information…by communicating over the phone you are getting that more intimate information rather than just ticking off boxes on the computer. I'm sure the computer is fine if you are just sending a patient up from ED with a colles fracture but when it's all these other in-depth things, it's more complex."

III The third respondent out of 3 (33%) said that

"*…The phone call is only as good as how up-to-date the information is."*

4.6.3 Weaknesses of the phone call

Bed managers were asked: In your opinion what are the weaknesses of the phone calls (as opposed to written communication) in this intra-hospital ICU discharge coordination process?

Two themes emerged. Table 29 presents the findings.

Table 29 Weaknesses of the phone call

Delays in trying to get the person that they want to speak to
Some messages may not get passed on over the phone

67% (two out of 3) have experienced delays in trying to get the person that they want to speak with on the phone.

33% (one out of 3) recall how some messages may not get passed on over the phone, in these words:

> *" When you are really busy as a bed manager you could have said look this patient needs isolation and whatever the situation is…but then they could say…we never knew that...ICU might not tell us things and then the patient arrives on the ward and they discover the patient is more confused and actually does need a special."*

4.7 Conclusion

This chapter presented the findings from the qualitative interviews and the validating on-line surveys. The contacts, discussions, surrounding issues, strenghts and weaknesses of the phone call are presented. Chapter 5 will analyse these findings.

Chapter 5 Analysis and discussion

5.1 Introduction

This chapter now revisits the research questions and will provide an analysis and discussion of the findings that were presented in the results chapter. As outlined in chapter 3 the qualitative methodology used in this research study assisted in answering the research questions posed. Anaesthetist, charge nurse and bed manager information and communication needs will be analysed and discussed.

5.2 Research questions

The four research questions:

1. What are the information and communication needs surrounding ICU inter-hospital bed sourcing and transfer coordination?
2. What are the information and communication needs surrounding ICU inter-hospital transfer and intra-hospital discharge coordination?
3. How are the phone calls perceived?
4. How can a central bed management database facilitate timely bed sourcing?

5.3 Anaesthetist findings

5.3.1 Bed sourcing and referral by phone call findings

In order to answer the research questions posed, the researcher needed firstly to look to the literature to examine the process of generating and arranging an inter-hospital transfer. The literature is limited around in-depth studies on arranging the ICU transfer. Research began in 2005 when it was discovered that the more critical the patients were, the more phone calls back and forth by anaesthetists were required (Craig, 2005). In this research study this was discovered to be an issue with one anaesthetist from the interview excerpt in section 4.3.3, the need for the accepting registrar to discuss the case with the on-call consultant was reported to add to the 'long process' in the 'might be accepted' stage of the process. Therefore one might argue that the speed at which these calls are made could directly affect the patient's outcome. This process would benefit from information technology implementation to accelerate the process. One could hypothecate that speed dial connections would be a good early focus for improvement.

Craig (2005), Bosk (2011) and Sarti et al (2014) found that the number of phone calls involved in arranging ICU inter-hospital transfers are a timely distraction from patient care, cause inter-hospital friction and place a significant burden on the anaesthetist. Similarly time expenditure and pure time wastage often resulting in a zero return on effort to even locate a bed was found to be a cause of frustration in this research study. The time wastage on repeated phone calls and unproductive efforts to secure a bed for transfer not only had a negative impact on their ability to care for the patient being transferred but also to impact on the other patients. One of the eight major wastes, as described by lean manufacturing, is not utilising your employees' abilities to their fullest potential (Yerian et al., 2012). It could be argued that this is the most crucial step in the ICU inter-hospital transfer process not least because it takes the anaesthetist away from the direct care of the patient. It could be argued that this is the most serious issue of all the issues surrounding ICU bed sourcing, and referring especially, when it has been analogized to a 'lucky game' and the anaesthetist as a 'telephone operator' in this research study. It could be hypothesized that the time expenditure on bed sourcing is by far the most serious of all the issues surrounding ICU patient inter-hospital transfers when a critically ill patient needs admission to an ICU bed without delay for optimal care and outcome.

As displayed in Table 6 five issues emerged around the phone calling information seeking process to source an appropriate ICU bed, the other issues surrounding the inter-hospital arrangement pertained to lack of policies and lack of resources. Charge nurses identified with these organisational issues and in addition reported that equipment for transfer was 'less than ideal' .Therefore, in contrast to Fan et al (2006) the inter-hospital transfer was not found to be technically safe once the ICU bed is found, in this research study. As advocated by the Joint Comission, workflow process issues should be resolved prior to any technology implementation (JCI, 2008). There are 6 issues surrounding the inter-hospital discharge process as perceived by the anaesthetists outside of the information exchange issues. Anaesthetists offered suggestions to hasten the bed availability information search and referral process seeking assistance from the nursing staff, escalating to hospital manager or by having direct consultant to consultant contact . A centralised electronic bed availability system and central coordinator was perceived to be able to save time and make life very easy.

Similarly Sarti et (2014) speculate central bed management and tailored organisational interventions to maximise ICU bed use and provide equal access to quality critical care regardless of patient location.

As discovered by Bosk (2011) the negotiating process over the phone was found to be informal and cumbersome, however this study revealed that once the bed was located the phone call was regarded as the best means of communication. Anaesthetist's phone discussions were perceived as being best discussed over the phone as opposed to being sent by fax. The phone call was considered to be easier and immediate whilst giving the anaesthetist the opportunity to clarify things, to explain things better and to give immediate advice. These findings would suggest that the phone call provides very timely and safe information transmission when referring an ICU patient from one hospital to another. As described by Moorhead and Griffin (1998) effective organisational communication provides the right information, to the right person at the right time and in the right form. The only weaknesses of the phone calls were trying to get hold of the person, no record of the conversation and not having all the details to hand, however as one of the 6 (17%) suggested if one is prepared and has all the documents ready to hand they do no need to rely on memory.

5.3.2 In - depth interview findings

During in-depth interview discussions, 5 out of the 6 anaesthetists (83%) highlighted that sometimes the inter-hospital transfer is required if the patient needs a special treatment or national treatment. The only hospitals that do these treatments are contacted which significantly limits the number of ICU transfer options available. The on-line anaesthetist did not mention this current practice, suggesting that more information is obtained from a face-to-face interview. Sarti et al (2014) developed a descriptive meta-matrix in order to choose an optimum data collection method, In line with these recommendation the present research study employed a qualitative face-to-face interview to gain an in-depth understanding of the current system.

5.4 Charge nurse analysis

To coordinate the ICU inter-hospital discharge, charge nurses have 21 potential contacts and 9 potential discussions; 18 potential information needs surrounded by 25 potential issues. To cordinate the ICU intra–hospital admission, charge nurses have 8 potential contacts and 8 potential discussions; 10 potential information needs and 12 potential issues. From these findings it seems that both discharges are communication intensive with many contacts although there are more issues surrounding the inter-hospital discharge. One can assume that there are even more attempts to go to the phone to makes the calls because both processes have reported not being able to get the person you want or the phone ringing out, when asked

to report the weaknesses of the phone call. From these findings enhanced connectivity to the contacts would be a good early focus for improved information flow to accelerate the processes. timely

The ICU inter-hospital admission does not appear to be as communication intensive, however a large volume of information is yielded form the contacts and the discussions that are made. Charge nurses have 6 potential discussions with with 9 potential contacts requiring 18 potential information needs. 14 of these information needs are directly situation-focused pertaining to patient clinical information needs. One could speculate that the charge nurses in this study are not well supported by information technology for both process-focused and situation-focused needs. Therefore a delay in attaining these patient details further compounds the lack of information delivery support for process-focused managerial activities. Delayed communication could be the cause of serious problems as described by Lundgren-Laine et al (2013). In addition, telephone calls in this process are not always good at transmitting detailed clinical patient information, as reported something may not be heard, something can get missed or official investigation reports can be lacking. These issues call for electronic transmission of patient clinical details between hospitals as some charge nurse in this study have identied the advantages when tranfering patients within.

5.5 Central bed management database

The Sri Lankan example where it is possible to identify and contact the three closest ICUs, which have an empty bed, shows how this process can offer an early focus.

The NHS emergency bed service and NHS Dos serves very succinct guidance for times of 'business as usual' as well as times of extra acute need. It offers detail around levels of need guided by standard operating procedures. One crucial advantage of this system is the available (and frequently updated) data for levels of acuity of existing ICU patients as well as those awaiting discharge. Another important and very helpful piece of data from the NHS system is the level of acuity of existing patients, something that can prove very helpful in the event of a major incident since it is an indicator of the level of movement within an area or within a hospital. The Western Cape pilot Bed Bureau project has many echoes of the NHS Dos project and not surprising as it was especially set up to deal with mass casualties around the time of the World Cup, the South African project had only 12 hospitals unlike the large number in the NHS project.

The Irish example of NNTP shows how an even more bespoke speciality system works with its own retrieval team. This system has the dual benefit of knowing bed capacity and being able to quickly dispatch a retrieval team with speciality skills. Surely if circumstances were ideal across the health sector this dual pronged approach of monitoring beds and offering retrieval teams would be held as a gold standard. There is room to examine the financial benefits of more

specialized retrieval teams freeing up other hospital medical specialists.

The explanations of the Canadian, South - African and to a lesser extent the UK shows how an event such as pandemic or an escalated threat of a major incident has proved the driving force for formulating such bed databases. It is not a case of one size fits all but there are fundamental needs such as information on available ICU beds, either regionally or nationally, these are a crucial requirement from any such information system.

As anaesthetists have electronic access to the hospital systems in order to do their work it would seem a likely trajectory that easy access to an interactive system with real -time information is the way forward.

If the examples of pandemic flu and the real or anticipated need for readiness to deal with a major event and mass casualties it makes good sense to be prepared and have such a national bed database in place in readiness for escalated need as well as day to day efficiency of the limited ICU resources.

The current system of using telephone and fax is reminiscent of earlier outdated modes of communications for sourcing an urgent ICU bed. Ireland's geographic area and population distribution are essential considerations in the planning of an ICU bed database. A question that needs further exploration is whether replicating the Irish NNTP specialised retrieval team for all ICU transfers may be an adjunct to a new ICU bed availability information system with real -time information.

Chapter 6 Conclusions and recommendations

6.1 Introduction

The following recommendations and conclusions were formulated in light of the literature review and the detailed analysis of the information received from the face-to-face interviews and the on-line survey. The dissertation's main aims were to analyse the information and communication needs surrounding intensive care unit inter-hospital bed sourcing, referral and transfer coordination processes; and the related intra-hospital discharge coordination.

6.2 Recommendation for a national electronic bed information system

Based on the literature findings in chapter 3 and the research study's findings, Table 30 presents how an ICU bed could be sourced using an emergency bed centre coordinator and a centralised bed management database. The expected outcome for the proposed bed sourcing function are outlined in Table 31 How the patient overview may look is displayed in Table 32.

The Sri Lankan, English, Irish neonatal, Canadian and South African examples cited in chapter 2 and analyzed in Chapter 5, all point to the benefits of a central bed management database. No one system offers everything but there are some distinct aspects in each system that are noteworthy.

Table 30 Recommended bed sourcing and referral system

Procedure	Tools
Bed status update from all ICUs sent to emergency response centre four hourly	Electronic mail
If bed status not received, ICUs are contacted	Telephone for quick information gathering
If a bed is needed by the anaesthetist one single call is made	Emergency bed centre hotline
Bed request details given over the phone: Anaesthetists name, contact details, patient location, hospital name, patient's name, and level of ICU required	Telephone for easy and quick information transmission
Anaesthetist is given the names and contacts of the 3 nearest ICUs for the level of care required and is automatically connected to the first ICU of choice	Emergency centre's bed information system (BIS)
After bed confirmation the anaesthetist completes the electronic referral form and sends it to the receiving hospital	Electronic referral form
The anaesthetist phones the Emergency bed centre to request an appropriate ambulance	Telephone for a quick request
Emergency centre phones 2 hours later to determine outcome. If patient not transferred the reason is recorded. If patient was transferred the receiving hospital is contacted for time of arrival	Outcomes entered into the status column of the BIS for surveillance and auditing
In capacity surge situations data entry time intervals are decided at senior management level	

Table 31 Bed sourcing and referral expected outcomes

Potential issue	Information and communication need	Bed information system solution	Expected outcome
Patient is delayed due to the lack of information regarding bed availability	Information regarding the location of an available appropriate bed, relayed to the anaesthetist	The anaesthetist phones the 24/7 hotline for the nearest 3 ICUs matching the ICU patient level. A suitable ICU bed is found by the emergency response centre using the bed information system	Bed is sourced in a timely fashion leading to optimal patient outcome

Table 32 Bed sourcing screen outline

Hospital model	Hospital name	ICU name	ICU Speciality	Level 3 beds available	Level 3 +CRRT beds available	Level 1 patient waiting to be discharged	Level 0 patient waiting to be discharged	Existing patient acuity.	Free text
	Hospital group 1								
Model 3 Spoke ICU (no CRRT)									Expecting discharge in 1 hour
Model 4 regional (CRRT)					1				
Model 4 supra regional (CRRT and a national service)									1 bed committed
	Hospital group 2								
Model 3 Spoke ICU (no CRRT)				1			1		
Model 4 regional (CRRT)					1				
Model 4 supra regional (CRRT and a national service)									

6.3 Strengths and Limitations of the Study

A large amount of qualitative data was collated, however the time constraints did not allow the researcher to do the in-depth analysis that was anticipated. Due to time pressures the representation of anaesthetists from the supra-regional hospital was not possible and there was not enough time for the charge nurse on-line survey .

6.4 Recommendations for future work

The researcher advises a deeper analysis of the research study's findings and complimentary data from ethnography to compare actual behaviour with self reported behaviour may be useful.

6.5 Conclusion

The analysis of the information and communication needs surrounding the ICU inter-hospital bed sourcing, referral and transfers are widespread across the patient journey. In addition to communication needs there are substantial bed resource needs. Resolution of organisational issues should be a consideration before health information technology implementation.

The phone call has been identified as a valuble tool for quick and easy communication, real-time answers to questions and immediate advice on patient treatment, in this research study. ICU bed sourcing is a crucial step in the inter-hospital patient transfer, therefore a bed sourcing solution was identified as a priority, since current practice took clinicians away from direct patient care at such a critical time. Bed state information communicated through a central bed management database provides accurate, valid, safe and timely information delivery which gives resounding endorsement for 'live' ICU bed availability covering all areas of Ireland.

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Appendix 1. Critical care beds per 100,000 population in Europe

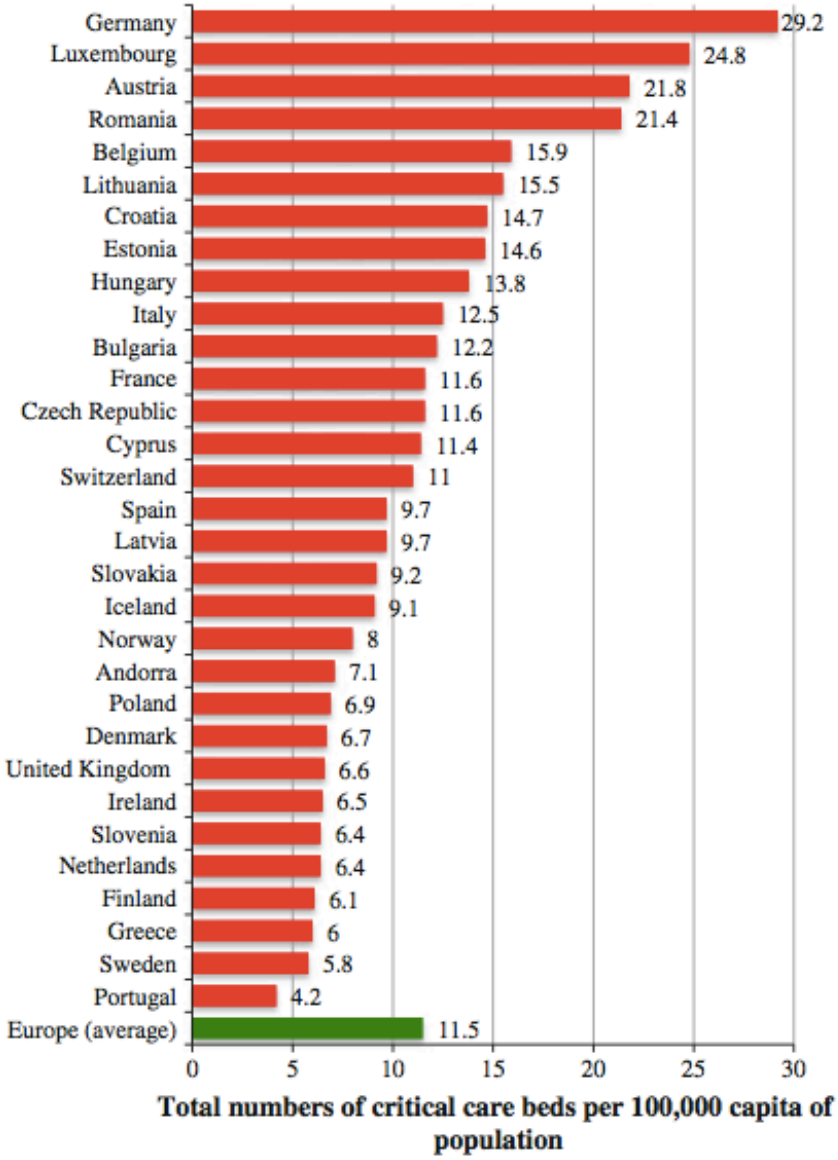


Fig. 1 Numbers of critical care beds corrected for size of population (per 100,000 inhabitants) for European countries

Reference: (Rhodes et al., 2012)

Appendix 2. Recommended Critical Care Service Network

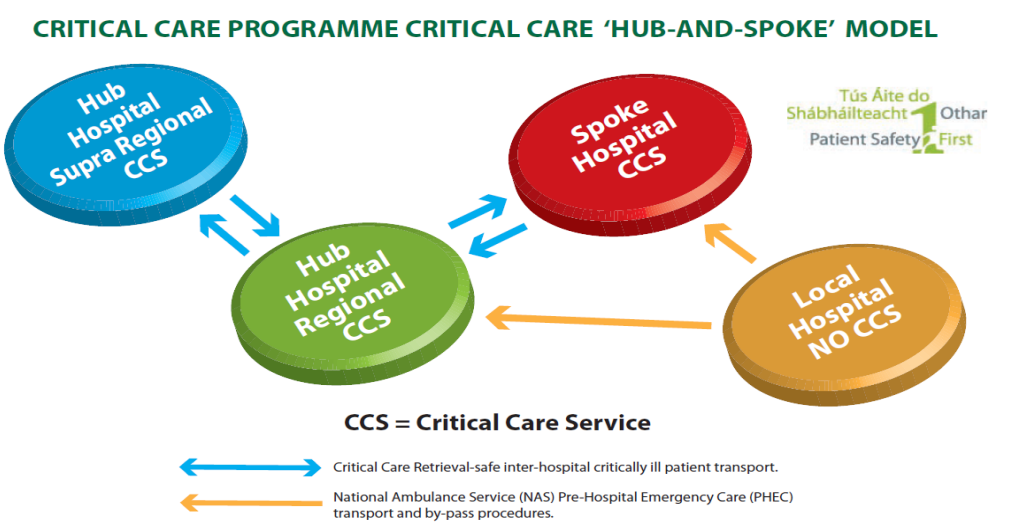
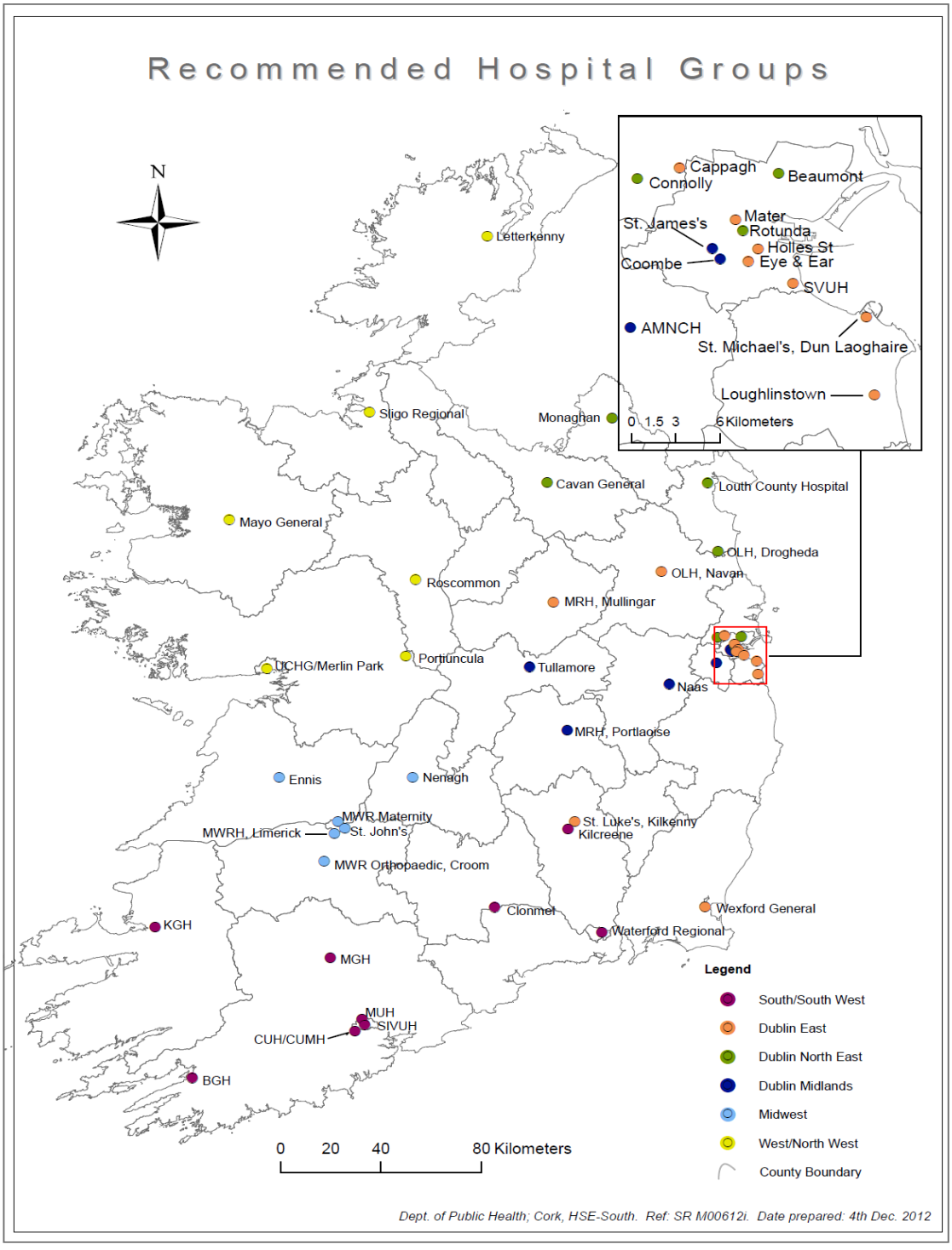


FIGURE 2:
Critical Care 'hub-and-spoke' configuration, National Clinical Programme for Critical Care . (Prospectus, 2009)

Reference: (Hse, 2014).

Appendix 3. Recommended Hospital Groups



Reference:(DOH, 2013)

Appendix 4. Levels of care, national standards for adult critical care

Acute Care	Level 0	Hospital ward clinical management
	Level 1	Higher level of observation eg. PACU
Critical Care	Level 2	Active management by critical care team to treat and support critically ill patients with primarily single organ failure
	Level 3	Active management by critical care team to treat and support critically ill patients with two or more organ failures
	Level 3s	Lvel 3 with regional/national service

FIGURE 3:
Levels of care, National Standards for Adult Critical Care Services 2011, Joint Faculty of Intensive Care Medicine of Ireland (p. 4)

Reference: (Hse, 2014).

Appendix 5. Optimum data collection Methods

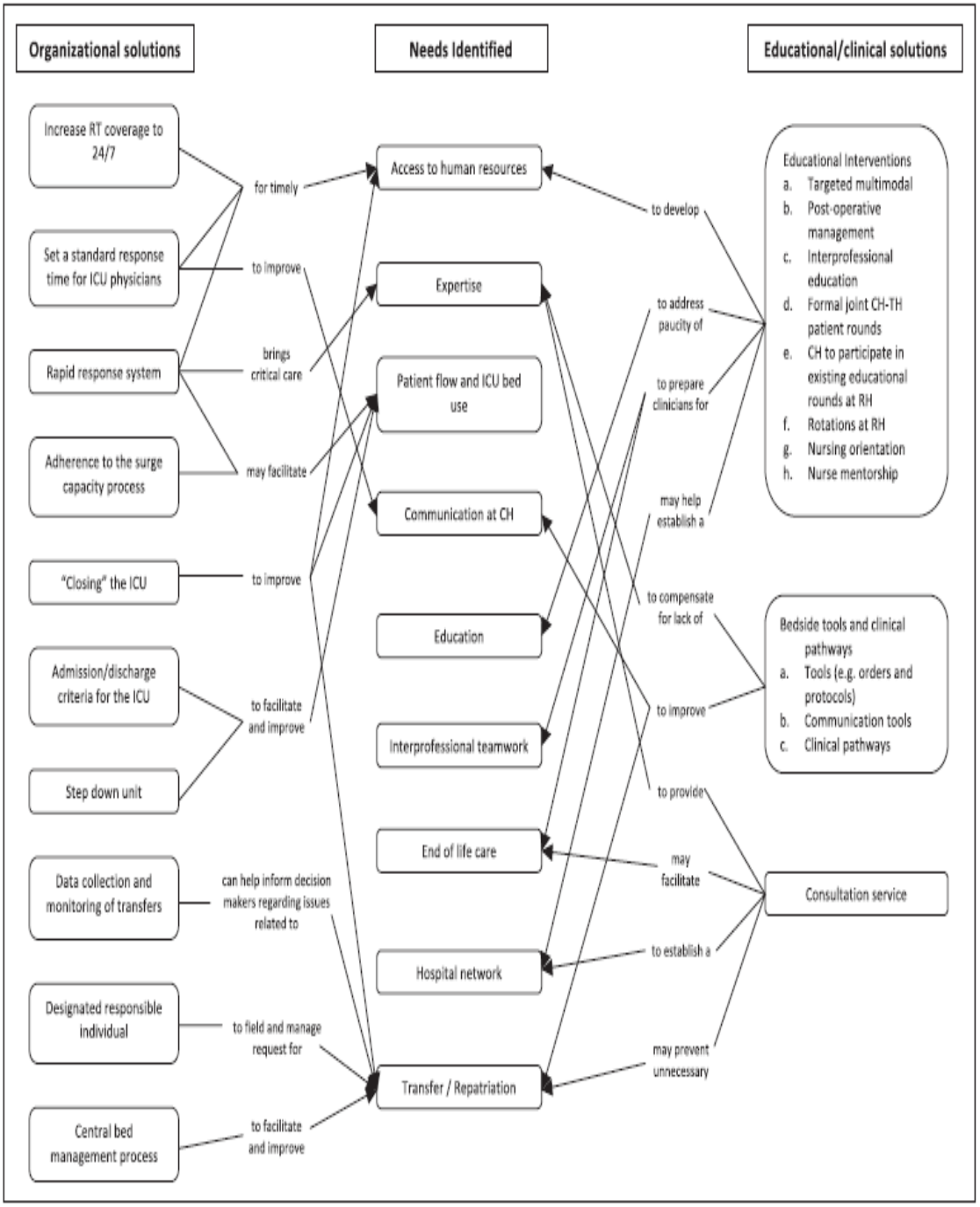
TABLE 1. Descriptive Meta-Matrix: Project Elements and Data Collection Methods

Element of Conceptual Framework	Perspective	Project Objective	Sampling Methods					
			Interviews	Focus Groups	Walk-throughs	Context Questions	Simulations	Family Surveys
Human capital—Refers to the expertise and human resources available to care for critically ill patients	System	Explore educational and systems issues from leadership perspective	✓					
	RH	Identify unperceived needs at CH	✓	✓				
		Determine perceived needs at RH						
	CH	Understand the context of care	✓	✓	✓	✓	✓	
		Determine perceived needs at CH						
		Identify unperceived needs at RH						
	Family	Seek the perspective of family members in terms of satisfaction of care provided						✓
Social capital (CH)—Refers to the connections between professionals within the CH	CH	Explore the relationship between professionals within the CH and how this impacts patient care	✓	✓	✓		✓	
Social capital (between the CH and the tertiary hospital)—Relationship is bidirectional, wherein the shared use of resources, flow of patients, and flow of knowledge impact the quality of care	System	Explore the relationship between the two sites as perceived by an outside source	✓					
	RH	Explore the relationship between the two sites and how this relationship impacts patient care	✓	✓				
	CH	Understanding the context of the referral process	✓	✓				
Physical capital—Refers to any assets, which are applied to care for critically ill patients, such as the availability of medications, ventilators, dialysis, and beds	System	Explore how regional services impact patient care	✓					
		Understand the regional vision						
	RH	Understand the context of the referral process	✓	✓				
	CH	Understand the context of care and the context of the referral process	✓	✓	✓	✓		
Patient and family beliefs/expectations—These beliefs and expectations have the potential to impact both the delivery of care and the perception of the quality of care	RH	Gain a better understanding of the beliefs of patients and family members and how these expectations may impact the care provided	✓	✓				
	CH		✓	✓				
	Family							✓

RH = referral hospital, CH = community hospital.

Reference:(Sarti et al., 2014)

Appendix 6. Organisational, Clinical and Educational Solutions



Reference:(Sarti et al., 2014)

Appendix 7. Charge Nurse Information Needs

Table 2 The most crucial information needs of Finnish and Greek charge nurses in order of importance under the six dimensions. 70% of the respondents rated these information needs as crucial with the median 9–10

Finland	Greece
Admission	Admission
• Need to isolate the patient	• The urgency of the patient's condition
• Patient's need for mechanical ventilation	• Patient's need for mechanical ventilation
• Method of patient isolation	• Need to isolate the patient
• Number of planned patients	• The patient's diagnosis
• Patient's scheduled time of arrival at the unit	• The method of patient isolation
• Information about the patient's personal identity code	• Emergency operations
Organization and management of work	• Planned procedures for planned patients
• Number of patients on the unit	*Organization and management of work*
• Patient's death	• Patient's allergies
• Staff skills and knowledge	• Patient medications that require intensive monitoring
• Special treatments given to patients	• Specific vital functions values
• Staff sick leaves	• Adjustments made to equipment supporting patient's vital functions
• Removal of a patient from isolation	• Dosages of patient medications that require intensive monitoring
• Scheduled examinations that will require patients transfer	• A significant change in the patient's condition during one's shift
• Normal staffing levels for each shift	• Complications arising during intensive care
• Patients admitted to ICU	• Patient medications that require intensive monitoring
• Staff on duty	• Patient's living will
• Number of patients per room	• Patient's death
• A significant change in the patient's condition during one's shift	• Medications given to patient
• Staff induction needs	• Compulsory infection samples
• Nursing staff special skills	• Staff skills and knowledge
• Compulsory infection samples	• Patient's intensive care diagnosis\diagnoses
• Real-time workloads at the unit	• Staff on duty
• Nursing staff skill mixes	• Nursing staff special skills
Staff allocation	• Amount of sedation given to patient
• Staffing level on current shift	• Scheduled examinations that will require patient transfer
• Nurse in charge/physician in charge of the unit	• Nursing staff skill mixes
• Staff resources that can be released	• Start time of patient hydration that requires intensive monitoring
• Number of nursing staff per patient	• Patient's blood products
• Skill mix on current shift	• Staff sick leaves
• Staff working on next shift	• Normal staffing levels for each shift
• Staffing levels for scheduled rosters	• Roster plans
• Number of nursing staff per patient room	• Number of patients on the unit
• Patient's nurse on each shift	• Vacant beds at the unit
Material allocation	• Staff induction needs
• Vacant beds at the unit	• Changes in patient hydration that requires intensive monitoring
Special treatments	• Complications related to the patient's diagnosis
• Planned special treatments	• Procedures in the case of adverse events
• Schedules dates for surgery or procedures	*Staff allocation*
• Start time of special treatments	• Number of nursing staff per patient
Discharge	*Material allocation*
• Patient being discharged	• Fixed equipment around each bed on the unit
• Transport cancellations	• Special medication at the unit
• Patient's time of discharge	• Special equipment at the unit
• Planned time of transport	• Products needed for special treatments
	Special treatments
	• Special treatments given to patients
	• Planned special treatments
	• Start time of special treatments
	Discharge
	• The ward were the patient is going has been notified
	• Family members have been notified of transfer
Altogether, 40 crucial information needs out of 122 in order of importance	Altogether, 47 crucial information needs out of 122 in order of importance

Reference: (Lundgrén-Laine et al., 2013)

Appendix 8. Information Sheet

TRINITY COLLEGE DUBLIN

INFORMATION SHEET

SEMI-STRUCTURED INTERVIEWS

Dear Colleague,

I would like to invite you to take part in a research study entitled "An Analysis of issues and information needs surrounding national intensive care unit (ICU) bed capacity management processes when an ICU patient needs an inter-hospital transfer and a proposal outline for a national electronic ICU bed capacity management system".

Please read the following points marked 1-14 below.

1. Why is this study being carried out?

Delays in ICU patient inter-hospital transfer have been associated with increased mortality, morbidity and longer hospital stays. The purpose of this research study is to carry out an analysis of issues and information needs surrounding national intensive care unit (ICU) bed capacity management processes when an ICU patient needs an inter-hospital transfer with an overall aim to propose an outline for an electronic ICU bed capacity management system (eICUBCM).

The researcher hypothesizes an integrated electronic system should help facilitate timely critical admission to an ICU bed when needed thus improving patient outcomes. However, in-depth analysis of the surrounding issues, information needs and a literature review to understand how an integrated eICUBCMS can help resolve the issues is needed before proposal outline development.

This research study is being undertaken by Marion Keegan as part of an MSc in Health Informatics in Trinity College Dublin. The study will be carried out between March and May 2015.

2. Why are you being invited to participate?

I am inviting you to participate in this study, as you are involved in a part of the ICU inter-hospital bed sourcing, referral or inter-hospital transfer co ordination process when an ICU patient needs an inter-hospital transfer.

3. What are the procedures of this study?

Initially, the researcher will carry out a literature review and then between March and May 2015

the researcher is carrying out semi-structured face-to-face interviews and on-line surveys with experts in the field. The researcher will collect data from anaesthetists regarding ICU referral issues and information needs when an ICU patient needs an inter-hospital transfer. The researcher will collect data from ICU charge nurses and hospital bed managers regarding ICU admission and discharge coordination issues and information needs when an ICU patient needs an inter-hospital transfer.

4. What do we want you to do?

If you agree to take part in this study you will need to sign two consent forms, one to keep and the other for the researcher. The researcher will then carry out a semi-structured, face-to-face interview with you where you will be asked to describe the issues you currently encounter around bed capacity management when an ICU patient needs an inter-hospital transfer.

The interview may range from 15 to 30 minutes.

The interview will be audio-recorded for transcription to ensure rigour. You can refuse to be audio-recorded; in this case the researcher will take written notes and email them to you to confirm their accuracy.

5. What will happen to the results of this research?

The results of the research will serve to inform the researcher of the issues and information needs surrounding bed capacity management when an ICU patient needs an inter-hospital transfer.

Participant and third party anonymity in analysis, publication and presentation of resulting data and findings will be preserved.

The results of the research will be submitted in partial fulfilment of the Masters in Health Informatics at Trinity College, Dublin. Others may use the research for academic research. The results may be presented at selected conferences in Ireland. The results will be made available to all research participants on completion of the research study.

6. Conflict of interest:

The researcher is an ICU agency nurse working consistently in the region in which the research will be undertaken. Some of the researcher's intended participants are work colleagues, there is a potential conflict of interest possibly taking advantage of existing relationships in order to make progress in the research.

7. You may refuse to answer any question and you may withdraw at any time without reason or penalty.

8. This study is not expected to involve any risks.

9. The researcher will make provisions for debriefing after your participation in this study.

10. All information collected during the course of the research will be kept strictly confidential.

11. Illicit activities made known during the course of this research will be reported to appropriate authorities.

12. You may stop audio recordings at any time, and you may at any time, even subsequent to your participation have such recordings destroyed (except in the case in point 11.above).

13. Subjecttotheconstraintsabove,norecordingswillbereplayedinanypublicforumormadeavailabletoanyaudienceotherthanthecurrentresearchers/researchteam.

14. Voluntary participation:

Your participation in this study is voluntary

If you are happy to participate please complete the attached consent form and return to Ms. Marion Keegan before taking part. Thank you for taking the time to read this information sheet and for considering taking part in this research.

If you require further information about this study please contact Marion Keegan who will be happy to answer your questions. Marion can be contacted by email: keeganm5@tcd.ie or by phone: 0852373588

Appendix 9. Consent For Interview

TRINITY COLLEGE DUBLIN

INFORMED CONSENT FORM

SEMI-STRUCTURED INTERVIEWS

LEAD RESEARCHER: Marion Keegan

BACKGROUND OF RESEARCH:

The purpose of this research study is to carry out an analysis of issues and information needs surrounding national intensive care unit (ICU) bed capacity management processes when an ICU patient needs an inter-hospital transfer and a proposal outline for a national electronic ICU electronic bed capacity management system.

PROCEDURES OF THIS STUDY:

Initially, the researcher will carry out a literature review and then between March and May 2015 the researcher is carrying out semi-structured face-to-face interviews and on-line surveys with experts in the field.

Issues and information needs surrounding the inter-hospital ICU patient referral process will be researched. In addition, the related issues and information needs surrounding the ICU inter-hospital admission and discharge coordination process and the intra-hospital ICU discharge coordination process will be researched.

A comprehensive information sheet will be made available to all potential participants.

PUBLICATION:

The results of the research will be submitted in partial fulfilment of the Masters in Health Informatics at Trinity College, Dublin. Others may use the research for academic research. The results may be presented at selected conferences in Ireland. The results will be made available to all research participants on completion of the research study.

DECLARATION:

- I am18 years or older and am competent to provide consent.
- I have read, or had read to me, a document providing information about this research and this consent form. I have had the opportunity to ask questions and all my questions have been answered to my satisfaction and understand the description of the research that is being provided to me.
- I agree that my data is used for scientific purposes and I have no objection that my data is published in scientific publications in a way that does not reveal my identity.
- I understand that if I make illicit activities known, these will be reported to appropriate authorities.
- I understand that I may stop electronic recordings at any time, and that I may at any time, even subsequent to my participation have such recordings destroyed (except in

situations such as above).

- I understand that, subject to the constraints above, no recordings will be replayed in any public forum or made available to any audience other than the current researchers/research team.
- I freely and voluntarily agree to be part of this research study, though without prejudice to my legal and ethical rights.
- I understand that I may refuse to answer any question and that I may withdraw at any time without penalty.
- I understand that my participation is fully anonymous and that no personal details about me will be recorded.
- I have received a copy of this agreement.

PARTICIPANT'S NAME: **PARTICIPANT'S SIGNATURE:**

---------- ----------

Date:

Statement of investigator's responsibility: I have explained the nature and purpose of this research study, the procedures to be undertaken and any risks that may be involved. I have offered to answer any questions and fully answered such questions. I believe that the participant understands my explanation and has freely given informed consent.

RESEARCHER'S CONTACTDETAILS: email: keeganm5@tcd.ie Phone: 0852373588

INVESTIGATOR'S SIGNATURE: **Date:**

Marion Keegan

Appendix 10. On-line Information Sheet

Exit this survey

Charge Nurses

1. Welcome to my survey - Information sheet for participants page1/2

1 / 6 17%

Dear Colleague,

I would like to invite you to take part in a research study entitled "An Analysis of issues and information needs surrounding national intensive care unit (ICU) bed capacity management processes when an ICU patient needs an inter-hospital transfer and a proposal outline for a national electronic ICU bed capacity management system".

Thank-you for participating your feedback is important. Please read the following points marked 1-12 below.

1. Why is this study being carried out?

Delays in ICU patient inter-hospital transfer have been associated with increased mortality, morbidity and longer hospital stays. The purpose of this research study is to carry out an analysis of issues surrounding national intensive care unit (ICU) bed capacity management processes when an ICU patient needs an inter-hospital transfer with an overall aim to propose an outline for an electronic ICU bed capacity management system (eICUBCM).

The researcher hypothesizes an integrated electronic system should help facilitate timely critical admission to an ICU bed when needed thus improving patient outcomes. However, in-depth analysis of the surrounding issues, information needs and a literature review to understand how an integrated eICUBCMS can help resolve the issues is needed before proposal outline development.

This research study is being undertaken by Marion Keegan as part of an MSc in Health Informatics in Trinity College Dublin. The study will be carried out between March and May 2015.

2. Why are you being invited to participate?

I am inviting you to participate in this study as you are involved in a part of the national ICU bed capacity management process.

3. What are the procedures of this study?

Initially, the researcher will carry out a literature review and then between March and May 2015 the researcher is carrying out semi-structured face-to-face interviews and

Exit this survey

Charge Nurses

2. Information sheet for participants page 2/2

2 / 6 33%

6. Conflict of interest:

The researcher is an ICU agency nurse working consistently in the region in which the research is being undertaken. Some of the researcher's intended participants are work colleagues, there is a potential conflict of interest possibly taking advantage of existing relationships in order to make progress in the research.

7. You may refuse to answer any question.

8. This study is not expected to involve risks greater than those ordinarily found in daily life.

9. The researcher can make provisions for debriefing after your participation in this study.

10. Participant and third party anonymity in analysis, publication and presentation of resulting data and findings will be preserved.

11. Illicit activities made known during the course of this research will be reported to appropriate authorities.

12. All information collected during the course of the research will be kept strictly confidential.

If you are happy to participate please read the consent form on the next page and indicate your consent by continuing to the questionnaire if you do not wish to consent you can exit the survey without submission by clicking on the "exit survey" button on the top right-hand side of the page.

Thank you for taking the time to read this information sheet and for considering taking part in this research. If you require further information about this study please contact Marion Keegan who will be happy to answer your questions. Marion can be contacted by email: keeganm5@tcd.ie or by phone: 0852373588.

Prev Next

on-line surveys with experts in the field.

The researcher will collect data from anaesthetists regarding referral issues and ICU charge nurses and hospital bed managers regarding ICU admission and discharge coordination issues and information needs when an ICU patient needs an inter-hospital transfer.

4. What do we want you to do?

Taking part in this on-line survey is entirely voluntary. If you are happy to take part, we are asking you to read the consent below. You are free to withdraw at any time, without giving a reason or incurring any penalty. Once you have read the consent form you can indicate your consent to take part by clicking on the url below that will take you through to the questionnaire. Here you are going to answer online a number of questions on the issues you currently encounter around bed capacity management when an ICU patient needs an inter-hospital transfer.

The survey will take approximately 10-15 minutes to complete.

5. What will happen to the results of this research?

The results of the research will serve to inform the researcher of the issues and information needs surrounding national ICU bed capacity management processes. An analysis of the issues and information needs will inform a proposal outline for an eICUBCMS.

Participant and third party anonymity in analysis, publication and presentation of resulting data and findings will be preserved.

The results of the research will be submitted in partial fulfillment of the Masters in Health Informatics at Trinity College, Dublin. Others may use the research for academic research. The results may be presented at selected conferences in Ireland. The results will be made available to all research participants on completion of the research study.

Next

Appendix 11. On-line consent form

Exit this survey

Charge Nurses

3. Consent form

3 / 6 50%

LEAD RESEARCHER: Marion Keegan

BACKGROUND OF RESEARCH:

The purpose of this research study is to carry out an analysis of issues and information needs surrounding national intensive care unit (ICU) bed capacity management processes when an ICU patient needs an inter-hospital transfer and a proposal outline for a national electronic ICU electronic bed capacity management system.

PROCEDURES OF THIS STUDY:

Initially, the researcher will carry out a literature review and then between March and May 2015 the researcher is carrying out semi-structured face-to-face interviews and on-line surveys with experts in the field.

Issues and information needs surrounding the inter-hospital ICU patient referral process is being researched. In addition, the related issues and information needs surrounding the ICU inter-hospital admission and discharge coordination process and the intra-hospital ICU discharge coordination process is being researched.

A comprehensive information sheet is available to all potential participants.

PUBLICATION:

The results of the research will be submitted in partial fulfillment of the Masters in Health Informatics at Trinity College, Dublin. Others may use the research for academic research. The results may be presented at elected conferences in Ireland. The results will be made available to all research participants on completion of the research study.

DECLARATION:

- I am 18 years or older and am competent to provide consent.
- I have read, or had read to me, a document providing information about this research and this consent form. I have had the opportunity to ask questions and all my questions have been answered to my satisfaction and understand the description of the research that is being provided to me.

- I agree that my data is used for scientific purposes and I have no objection that my data is published in scientific publications in a way that does not reveal my identity.

- I understand that if I make illicit activities known, these will be reported to appropriate authorities.

- I understand that, subject to the constraints above, no recordings will be replayed in any public forum or made available to any audience other than the current researchers/research team.

- I freely and voluntarily agree to be part of this research study, though without prejudice to my legal and ethical rights.

- I understand that I may refuse to answer any question and that I may withdraw at any time without penalty.

- I understand that my participation is fully anonymous and that no personal details about me will be recorded.

- I understand that if I or anyone in my family has a history of epilepsy then I am proceeding at my own risk.
- I have received a copy of this agreement via https://www.surveymonkey.com /s/ChargeNurses

If you are happy to participate please indicate your consent to participate by continuing on to the questionnaire on the next page. If you do not wish to participate you can exit now by clicking the "exit survey" button on the top right-hand side of the page.

If you require further information about this study please contact Marion Keegan who will be happy to answer your questions. Marion can be contacted by email: keeganm5@tcd.ie or by phone: 0852373588.

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Appendix 12. Interview Guide for Anaesthetic Interviews

Semi-Structured Face-To-Face Interview Guide 1 – Anaesthetists

Research study title:

An Analysis of issues surrounding national intensive care unit (ICU) bed capacity management processes when an ICU patient needs an inter-hospital transfer and a proposal outline for a national electronic (ICU) bed capacity management system

Lead researcher

Marion Keegan

Date: Start time: Finish time:

15-30 minute approximately or longer if the interviewee would like to talk about the subject further.

Introduction

- Introduction of interviewer
- Thank participant for their participation
- Explain the purpose of research and interview - to understand the issues surrounding the ICU patient inter-hospital transfer referral process
- Reassure participant of full confidentiality and anonymity
- Explain that each question is optional and participants can feel free to omit a response to any question; however the researcher would be grateful if all questions are responded to.
- Ask participant not to name third parties - any such replies will be anonymised.
- Explain that in the extremely unlikely event that illicit activity is reported the researcher is obliged to report it to appropriate authorities.
- Ask participant if they have any questions regarding the information sheet or consent form.

Questions:

1. How many years are you practicing as an Anaesthetist?
2. How do you source an ICU bed in another hospital's ICU when you have no ICU beds or appropriate treatment for the patient at your hospital? *Probe*: Can you talk me through the steps that you take?
3. In your opinion, what are the issues surrounding the ICU bed sourcing process? Probes: *are there any problems with arranging or generating an ICU bed? Are there issues with information exchange?*
4. What do you discuss with the receiving anaesthetist when referring an ICU patient to another hospital's ICU?
5. What do you do to speed up this process?
6. In your opinion what are the strengths of the phone call (as opposed to written communication in this referral process? Probe: *Do the phone calls add value?*
7. In your opinion what are the weaknesses of the phone call discussions (as opposed to a written communication) in this referral process? Probe: *Do the phone calls cause problems?*
8. In your opinion are there any issues surrounding the process to receive an ICU referral from another hospital?
9. What are the strengths of the phone calls (as opposed to a written communication) when receiving an ICU referral from another hospital? Probe: Do the phone calls add value?
10. What are the weaknesses of the phone calla (as opposed to written communication) when receiving an ICU referral from another hospital?
11. Are there any additional comments that you would like to make? *Probe*: What are your overall thoughts on this sourcing a bed and referral process?

Conclusion

Thank the participant for their time taken to complete the interview and for their interest in the research study.

Appendix 13. Interview Guide for Charge Nurses Interviews

Semi-Structured Face-to-Face Interview Guide 2 - Charge Nurses

Research study title:

An Analysis of issues and information needs surrounding national intensive care unit (ICU) bed capacity management processes when an ICU patient needs an inter-hospital transfer and a proposal outline for a national electronic (ICU) bed capacity management system.

Lead researcher

Marion Keegan

Date: Start time: Finish time:

15-30 minutes approximately or longer if the interviewee would like to talk about the subject further.

Introduction

- Introduction of interviewer
- Thank the participant for their participation
- Purpose of research and interview to understand the issues surrounding the ICU patient admission and discharge coordination when an ICU patient needs an inter-hospital transfer.
- Reassure participant of full confidentiality and anonymity
- Explain that each question is optional and participants can feel free to omit a response to any question; however the researcher would be grateful if all questions are responded to.
- Ask participant not to name third parties- any such replies will be anonymised
- Explain that In the extremely unlikely event that illicit activity is reported the researcher is obliged to report it to appropriate authorities
- Ask participant if they have any questions regarding the information sheet or consent form.

Questions:

1. How many years are you practicing as an ICU charge nurse?
2. At 9am you have an ICU patient who has been accepted by another hospital's ICU, you need to co ordinate the inter-hospital ICU transfer process. What are your information needs to coordinate/facilitate this inter-hospital ICU discharge transfer process?
3. Whom do you contact to coordinate/facilitate the ICU inter-hospital discharge transfer process?
4. Can you describe what you discuss with each person when coordinating the ICU inter-hospital discharge transfer process?
5. In your opinion what are the issues surrounding the ICU inter-hospital discharge transfer coordination process? Probes: are there any problems with this coordination/facilitation process? Are there any problems with information exchange?
6. What do you do to speed up this process?
7. In your opinion what are the strengths of the phone calls (as opposed to written communication) in this inter-hospital ICU discharge transfer coordination process? Probe: do the phone calls add value?
8. In your opinion what are the weaknesses of the phone calls (as opposed to written communication) in this inter-hospital ICU discharge transfer coordination process? Probe: do the phone calls cause any problems?
9. At 6pm you need to discharge transfer an ICU patient to another hospital's ICU, how does the coordination/facilitation process differ at this time? Probe: is the out of hour's service different?
10. At 9am you need to accept an ICU admission transfer from another hospital's ICU, what are your information needs to coordinate/facilitate this inter-hospital ICU admission transfer process?
11. Whom do you contact to coordinate/facilitate the admission transfer of an ICU patient from another hospital's ICU?
12. Can you describe what you discuss with each person to coordinate/facilitate the admission transfer of an ICU patient from another hospital's ICU?
13. In your opinion what are the issues surrounding this ICU admission transfer from another hospital process? Probes: are there any problems with this coordination/facilitation process? Are there any problems with information exchange?
14. What do you do to speed up this process?
15. In your opinion what are the strengths of the phone call (as opposed to written communication) in this coordination/facilitation process? Probe: do the phone calls add value?
16. In your opinion what are the weaknesses of the phone calls (as opposed to written communication) in this coordination/facilitation process? Probes: do the phone calls cause any problems?
17. An ICU patient needs to be discharged to a step-down unit or ward when another ICU patient needs admission to that bed. What are your information needs to coordinate/facilitate the intra-hospital ICU discharge process?
18. Whom do you contact to coordinate/facilitate the intra-hospital ICU discharge?
19. Can you describe what you discuss with each person when coordinating the

intra-hospital ICU discharge transfer?

20. In your opinion, what are the issues surrounding this intra-hospital ICU discharge coordination process? Probes: are there any problems with this coordination/facilitation process? Are there any problems with information exchange?
21. What do you do to speed up this intra-hospital ICU discharge coordination process?
22. In your opinion what are the strengths of the phone calls (as opposed to written communication) in this intra-hospital ICU discharge coordination process?
23. In your opinion what are the weaknesses of the phone calls (as opposed to written communication) in this intra-hospital ICU discharge coordination process?
24. Are there any additional comments that you would like to add? Probe: What are your overall thoughts on this coordination of inter-hospital and intra-hospital ICU transfers

Conclusion

Thank the participant for their time taken to complete the interview and for their interest in the research study.

Appendix 14. Interview guide for Bed Manager Interview

Semi-Structured Face-To-Face Interview Guide 3 – Bed Managers

Research study title:

An Analysis of issues and information needs surrounding national intensive care unit (ICU) bed capacity management processes when an ICU patient needs an inter-hospital transfer and a proposal outline for a national electronic (ICU) bed capacity management system

Lead researcher

Marion Keegan

Date: Start time: Finish time:

15-30 minutes approximately or longer if the interviewee would like to talk about the subject further.

Introduction

- Introduction of interviewer
- Thank the participant for their participation
- Purpose of research and interview- to understand the issues and information needs surrounding the ICU patient admission and discharge coordination process, when an ICU patient needs an inter-hospital transfer.
- Reassure participant of full confidentiality and anonymity
- Explain that each question is optional and participants can feel free to omit a response to any question; however the researcher would be grateful if all questions are responded to.
- Ask participant not to name third parties- any such replies will be anonymised
- Explain that In the extremely unlikely event that illicit activity is reported the researcher is obliged to report it to appropriate authorities
- Ask participant if they have any questions regarding the information sheet or consent form.

Questions:

1. How many years are you practicing as a hospital bed manager?
2. Do you source or coordinate/facilitate any part of the ICU inter-hospital transfer process?
3. An ICU patient needs to be discharged to a step-down unit or ward when another ICU patient needs admission to that bed. What are your information needs to coordinate/facilitate the intra-hospital ICU discharge process? Probes: bed availability? Attendants? Equipment ready on the ward?
4. Whom do you contact to coordinate/facilitate the intra-hospital ICU discharge? Probes: Bed manager, attendant, ward nurse, anaesthetist
5. Can you describe what you discuss with each person when coordinating the intra-hospital ICU discharge transfer?
6. In your opinion, what are the issues surrounding this intra-hospital ICU discharge coordination process? Probes: are there any problems with this coordination/facilitation process? Are there any problems with information exchange?
7. What do you do to speed up this intra-hospital ICU discharge coordination process?
8. In your opinion what are the strengths of the phone calls (as opposed to written communication) in this intra-hospital ICU discharge coordination process?
9. In your opinion what are the weaknesses of the phone calls (as opposed to written communication) in this intra-hospital ICU discharge coordination process?
10. Are there any additional comments that you would like to add? Probe: What are your overall thoughts on the coordination of the intra-hospital discharge process?

Conclusion

Thank the participant for their time taken to complete the interview and for their interest in the research study.

Appendix 15. Anaesthetist on-line survey

Exit this survey

Anaesthetists

Questionnaire

Each question is optional, feel free to omit a response to any question; however the researcher would be grateful if all questions are responded to.

1. How many years are you practicing as an Anaesthetist?

2. How do you source an ICU bed in another hospital's ICU when you have no ICU beds or appropriate treatment for the patient at your hospital?

3. In your opinion, what are the issues surrounding the ICU bed sourcing process?

4. What do you discuss with the receiving anaesthetist over the phone when referring an ICU patient?

5. What do you do to speed up this process?

6. In your opinion, what are the strengths of the phone call discussions (as opposed to written communication) in this referral process?

7. In your opinion, what are the weaknesses of the phone call discussions (as opposed to written communication) in this referral process?

8. In your opinion, are there any issues surrounding the process to receive an ICU referral from another hospital ?

9. What are the strengths of the phone calls (as opposed to written communication) when receiving an ICU referral from another hospital?

10. What are the weaknesses of the phone calls (as opposed to written communication) when receiving an ICU referral from another hospital?

11. Are there any additional comments that you would like to make?

Prev Next

Exit this survey

Anaesthetists

Thank you

Thank-you for your time taken to complete this survey and for your interest in the research study. Please press done.

Prev Done

Appendix 16. Charge Nurses on-line survey

Charge Nurses

4. Questionnaire

Each question is optional, feel free to omit a response to any question; however the researcher would be grateful if all questions are responded to.

1. How many years are you practicing as an ICU charge nurse?

2. At 9am you have an ICU who has been accepted by another hospital's ICU, you need to coordinate the inter-hospital ICU discharge process. What are your information needs to coordinate/facilitate this inter-hospital ICU discharge process?

3. Whom do you contact to coordinate/facilitate the ICU inter-hospital discharge process?

4. Can you describe what you discuss with each person when coordinating the ICU inter-hospital discharge process?

5. In your opinion what are the issues surrounding the inter-hospital ICU discharge coordination process?

6. What do you do to speed up this process?

7. In your opinion what are the strengths of the phone calls (as opposed to written communication) in this inter-hospital ICU discharge coordination process?

8. In your opinion what are the weaknesses of the phone calls (as opposed to written communication) in this inter-hospital ICU discharge transfer coordination process?

9. At 6pm you need to transfer an ICU patient to another hospital's ICU, how does the coordination/facilitation process differ at this time?

10. At 9am you need to accept an ICU admission transfer from another hospital's ICU, what are your information needs to coordinate/facilitate this inter-hospital ICU admission process?

11. Whom do you contact to coordinate/facilitate the admission of an ICU patient from another hospital's ICU?

12. Can you describe what you discuss with each person to coordinate/facilitate the admission of an ICU patient from another hospital's ICU?

13. In your opinion what are the issues surrounding this ICU admission from another hospital process?

14. What do you do to speed up this process?

15. In your opinion what are the strengths of the phone call (as opposed to written communication) in this coordination/facilitation process?

16. In your opinion what are the weaknesses of the phone calls (as opposed to written communication) in this coordination/facilitation process?

Charge Nurses

5. Questionnaire

Each question is optional, feel free to omit a response to any question; however the researcher would be grateful if all questions are responded to.

17. An ICU patient needs to be discharged to a step-down unit or ward when another ICU patient needs admission to that bed. What are your information needs to coordinate/facilitate the intra-hospital ICU discharge transfer process?

18. Whom do you contact to coordinate/facilitate the intra-hospital ICU discharge process?

19. Can you describe what you discuss with each person when coordinating the intra-hospital ICU discharge transfer?

20. In your opinion what are the issues surrounding this intra-hospital ICU discharge coordination process?

21. What do you do to speed up this intra-hospital ICU discharge coordination process?

22. In your opinion what are the strengths of the phone calls (as opposed to written communication) in this intra-hospital ICU discharge coordination process?

23. In your opinion what are the weaknesses of the phone calls (as opposed to written communication) in this intra-hospital ICU discharge coordination process?

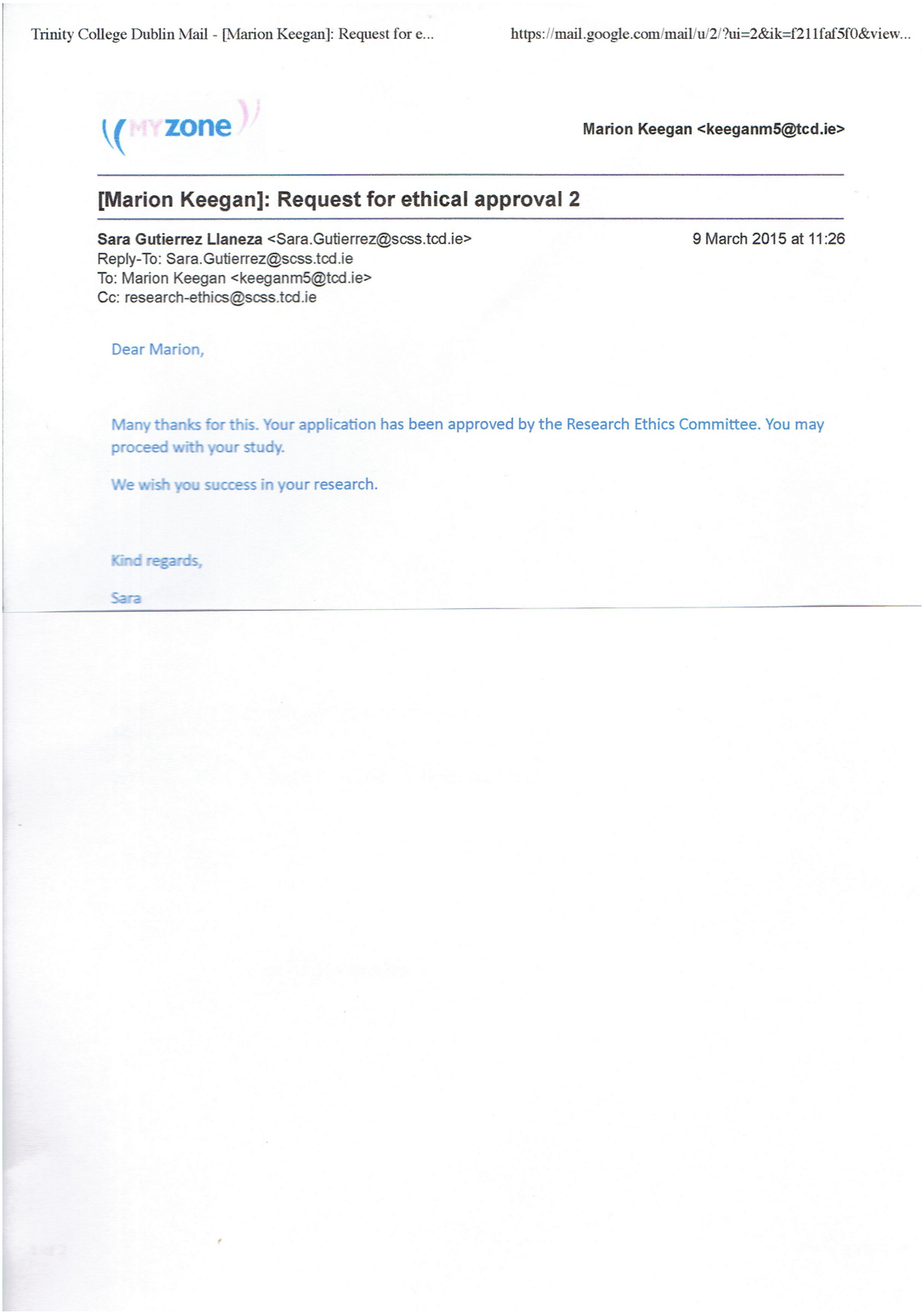
24. Are there any additional comments that you would like to add?

Charge Nurses

6. Thank you

Thank-you for your time taken to complete this survey and for your interest in the research study. Please press done.

Appendix 17. Ethical Approval – Trinity College Dublin



Trinity College Dublin Mail - [Marion Keegan]: Request for e... https://mail.google.com/mail/u/2/?ui=2&ik=f211faf5f0&view...

MYZONE

Marion Keegan <keeganm5@tcd.ie>

[Marion Keegan]: Request for ethical approval 2

Sara Gutierrez Llaneza <Sara.Gutierrez@scss.tcd.ie> 9 March 2015 at 11:26
Reply-To: Sara.Gutierrez@scss.tcd.ie
To: Marion Keegan <keeganm5@tcd.ie>
Cc: research-ethics@scss.tcd.ie

Dear Marion,

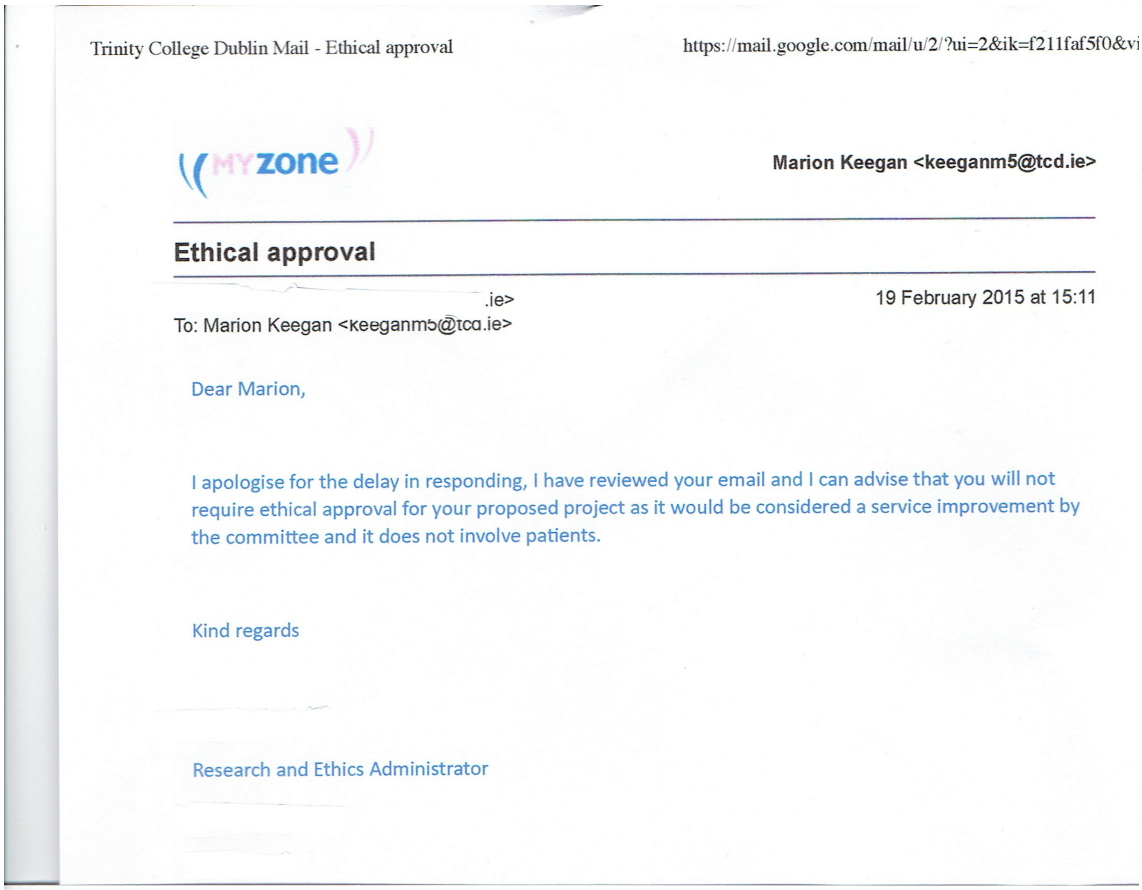
Many thanks for this. Your application has been approved by the Research Ethics Committee. You may proceed with your study.

We wish you success in your research.

Kind regards,

Sara

Appendix 18. Ethical Approval non-requirement - Regional and Supra-Regional



Trinity College Dublin Mail - Ethical approval https://mail.google.com/mail/u/2/?ui=2&ik=f211faf5f0&vi

MYZONE

Marion Keegan <keeganm5@tcd.ie>

Ethical approval

.ie> 19 February 2015 at 15:11

To: Marion Keegan <keeganm5@tcd.ie>

Dear Marion,

I apologise for the delay in responding, I have reviewed your email and I can advise that you will not require ethical approval for your proposed project as it would be considered a service improvement by the committee and it does not involve patients.

Kind regards

Research and Ethics Administrator

Appendix 19. Ethical Application - Spoke Hospital

MYZONE

Marion Keegan <keeganm5@tcd.ie>

Research ethical approval

1 message

Marion Keegan <keeganm5@tcd.ie> 19 February 2015 at 15:24
T[redacted]ise.ie

Dea[redacted]

I am Marion Keegan, a Health Informatics Masters student in Trinity College Dublin and an agency ICU nurse currently working in Leinster. I am preparing to undertake my research dissertation in March 2015 in part fulfillment of this course.
The title of my research study is - An analysis of issues and information needs surrounding national intensive care unit (ICU) bed capacity management processes when an ICU patient needs an inter-hospital transfer and a proposal outline for a national electronic ICU bed capacity management system.
For this study I am proposing to interview and survey purposively chosen health professionals i[redacted] I plan to collect data fro[redacted]
Anaethetists, ICU Charge Nurses and Hospital bed managers on their issues and information needs surrounding this work process. I am not interviewing nor surveying patients in this research study.
The proposed data collection instruments for this study are face-to-face interview and on-line survey.

I am writing to you to request permission to conduct interviews [redacted] A

research supervisor Dr. Bridget Kane from Trinity College will be overseeing the proposed study.
I am available to meet with you at your convenience to discuss this study further and to provide clarificaton of any details.
My phone number is 085-2373588 should you wish to contact me.

Thanking you,

Yours sincerely,

Marion Keegan

Appendix 20. Ethical Application – Spoke Hospital

MYZONE

Marion Keegan <keeganm5@tcd.ie>

Marion Keegan's research proposal

Marion Keegan <keeganm5@tcd.ie> 10 March 2015 at 22:00
To: [redacted]hse.ie

Hi [redacted]

As discussed yesterday, attached please find:

Research study proposal, information sheet and consent form for interviews and on-line surveys x 3.

As discussed yesterday, my research proposal has been accepted by the TCD ethics committee and the [redacted]s committee do not require ethical approval due to my proposal being considered as a service improvement and it does not involve patients. A research supervisor Dr. Bridget Kane from Trinity College will be overseeing the proposed study.

I am available to meet with you at your convenience to discuss this study further and to provide clarificaton of any details or you may be able to provide a response tomorrow. My phone number is 085-2373588 should you wish to contact me.

https://www.surveymonkey.com/s/C8RT39Z

https://www.surveymonkey.com/s/JMD2QJP

https://www.surveymonkey.com/s/2D5ZRBZ

Many Thanks for your time,

Kind regards,

Marion

3 attachments

INFO SHEET- interviews.docx
121K

Appendix 21. Ethical Application - Spoke Hospital

Version 5.5 May 2011

STANDARD APPLICATION FORM

For the Ethical Review of Health-Related Research Studies, which are not Clinical Trials of Medicinal Products For Human Use as defined in S.I. 190/2004

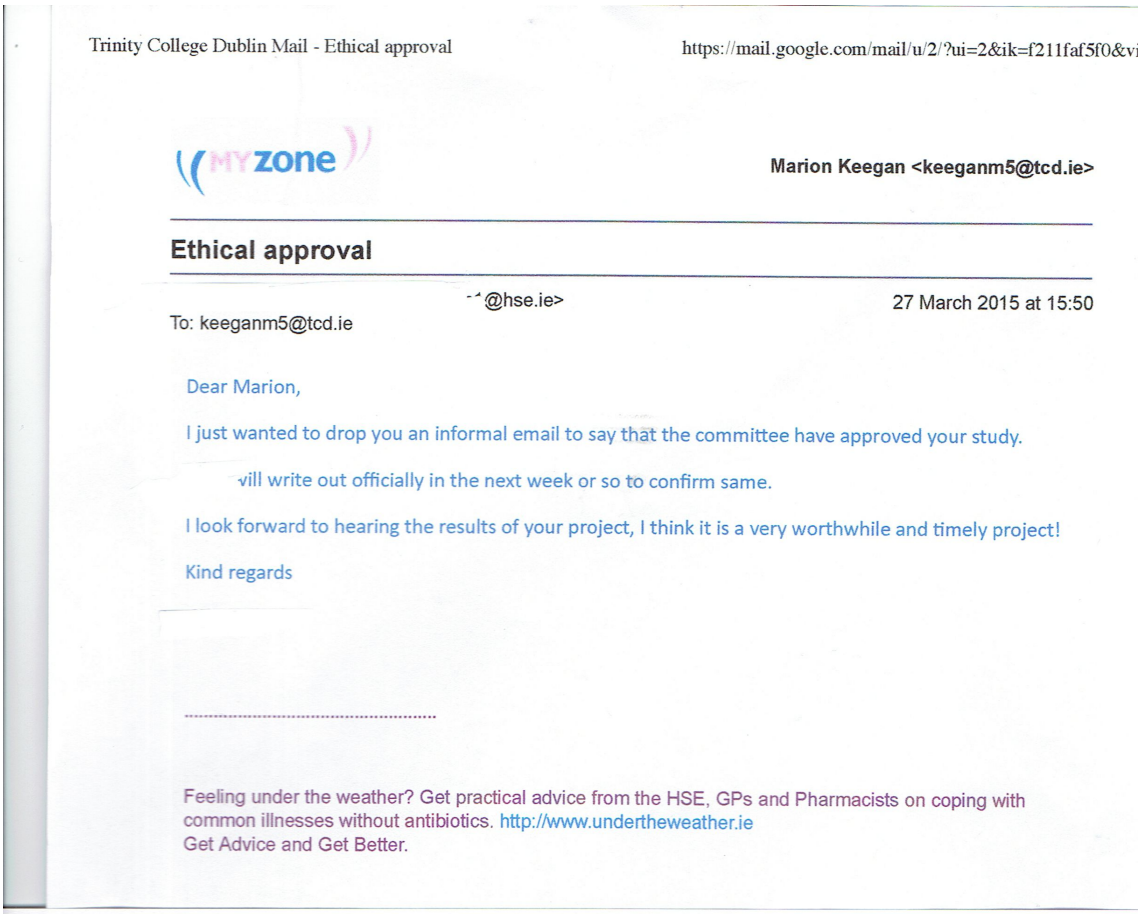
DO NOT COMPLETE THIS APPLICATION FORM
IF YOUR STUDY IS A CLINICAL TRIAL OF A MEDICINAL PRODUCT

Title of Study:_____ An analysis of issues and information needs surrounding national intensive care unit (ICU) bed capacity management processes when an ICU patient needs an inter-hospital transfer and a proposal outline for a national electronic ICU bed capacity management system

Principal Investigator:____Marion Keegan

Applicant's Signature:_____ Marion Keegan 20/3/15

Appendix 22. Ethical approval – Spoke Hospital



Trinity College Dublin Mail - Ethical approval https://mail.google.com/mail/u/2/?ui=2&ik=f211faf5f0&vi

MYZONE

Marion Keegan <keeganm5@tcd.ie>

Ethical approval

@hse.ie> 27 March 2015 at 15:50

To: keeganm5@tcd.ie

Dear Marion,

I just wanted to drop you an informal email to say that the committee have approved your study.

vill write out officially in the next week or so to confirm same.

I look forward to hearing the results of your project, I think it is a very worthwhile and timely project!

Kind regards

.....

Feeling under the weather? Get practical advice from the HSE, GPs and Pharmacists on coping with common illnesses without antibiotics. http://www.undertheweather.ie
Get Advice and Get Better.

Appendix 23. Permission to proceed in the Supra-regional Hospital -Nursing Research Access Committee

Trinity College Dublin Mail - HI research study https://mail.google.com/mail/u/2/?ui=2&ik=...

MYZONE

Marion Keegan <keeganm5@tcd.ie>

HI research study

15 May 2015 at 10:53

To: Marion Keegan <keeganm5@tcd.ie>

Yes Marion,

You are able to proceed. Apologies for delay. I will send your letter of approval in the post. Please emil me tour postal address. It will not be until late next week at the earliest but in the meantime you are free to proceed.

Kind Regards,

Appendix 24. Excerpts from Anaesthetists' interview question 2

"*Call the Anaesthetic registrar in …hospital, who is on call at that moment, and I will explain the condition of the patient, the unavailability of a bed in our hospital, and I request a transfer. If the patient needs dialysis I will ring only the hospitals that do haemofiltration/haemodialysis. If patient comes with a drug OD I will try ……(*other nearby spoke hospitals*). I know where to call. I will always try … (*regional hospital*) first."*

"We have to ring all the tertiary hospitals, in Dublin then outside Dublin. …, … (other spoke ICUs) then go further. Normally we will find a bed, sometimes it is difficult in Dublin. Then we have to find a bed a little bit further- …,…,…. Once I transferred a patient to ..., once I had to look for a bed in …, so you can understand it is so difficult. If no beds then we have no choice but to ventilate the patient in our recovery room. There are issues with the nursing, we have a ventilator, we can ventilate, but because of the nursing shortage we have serious issues around who is going to look after the patient in the recovery room. We can ventilate the patient in the resus, but the nurses are not trained to look after the ICU patients for a long period of time. We can ventilate but it is a manpower issue as well. At times we have a nurse but the patient needs to be transferred to a tertiary referral hospital. Sometimes you need to transfer irrespective, sometimes you have a bed but the patient needs to be transferred for some specific treatment which we can't provide. It's not always that the bed is an issue sometimes we can't provide that service and we need a bed."

"The procedure here is we first ask the relevant team, surgical or medical, to get the patient accepted surgically or medically in the appropriate hospital. Then we talk to the anaesthetist in the ICU there, and ask about the bed availability. Tell them the patient history etc and that the patient has been accepted. After all this they might say, we don't have a bed. So the procedure has to be repeated again. If they have a bed they will accept, but after the surgical team or medical team may have issues. Sometimes the medical or surgical team may say this patient only needs an ICU bed to be managed so we do it the other way around. I say before I tell you the history, do you have a bed? Not to waste my time. If they say OK tell me the history, this means they potentially have a bed. But they may say they do not have certain backup for neurology, renal etc. If I am asked. I will say what is the problem? I will then ask how is the kidney? Because we do not have dialysis. There is no system, telling us what hospital has a bed it would make life very easy if we knew. We are calling whatever comes to mind, really a waste

*of time. We might tell whole the whole history with questioning might take a half hour then oh sorry we don't have a bed. i*f there was a *bed availability system availability it would save time, it might take four or five hours. Sometimes we call administration and can be a lot of politics around it. From ICU to ICU is much easier. Generally we go to far away places if we don't find a bed in Dublin. Getting a bed in …,…,… (Dublin hospitals) is always difficult. In the countryside, we can usually find a bed, but the distance is far away - If straightforward COAD, needs ventilation - OD patient main issue ventilation. From A and E, we don't know much about the patient; I have minimal information at this time."*

"We ring the other ICUs in the city or I ring the consultant there, to see if they have a bed available. I very occasionally might ring … (spoke ICU) but I am normally reluctant to send a patient out of the city and perhaps to a different level of hospital, so I would tend to want to keep them in the city."
Interviewer: "And do you get that bed?"
"Not always, sometimes we don't.
Interviewer: "And do you look further?"
"No we might have to bring the patient into theatre and ventilate them in theatre until an ICU bed becomes available."

"If we are in A and E for example and we didn't have anywhere to put them, it would be myself or the admitting team ringing around, who would ring around ICUs and ask them. More often than not there is not a bed in which case..in this hospital..the protocol is to…it is difficult to leave patients ventilated in A AND E …so they would have to come up to theatre if we were full to capacity in our ICU and PACU. An anaesthetist would have to stay with the patient and that's a big problem. That's one of our staff gone for the day. If it's filtration, that's even more of an issue because if the patient's are already on filters that you have there is an issue."

Appendix 25. One Anaesthetist's responses to the on-line survey

Q1: How many years are you practicing as an Anaesthetist?

Five

Q2: How do you source an ICU bed in another hospital's ICU when you have no ICU beds or appropriate treatment for the patient at your hospital?

Call ICU directly & speak to CNM/Reg oncall/ consultant

Q3: In your opinion, what are the issues surrounding the ICU bed sourcing process?

Takes a lot of time

Q4: What do you discuss with the receiving anaesthetist over the phone when referring an ICU patient?

Patient details- condition/ ventilated/ niño tropes etc Hx & ongoing management

Q5: What do you do to speed up this process?

Respondent skipped this question

Q6: In your opinion, what are the strengths of the phone call discussions (as opposed to written communication) in this referral process?

2 way conversation- they can ask q - you can explain things easier than in writing

Q7: In your opinion, what are the weaknesses of the phone call discussions (as opposed to written communication) in this referral process?

Sometimes you can't get hold of them

Q8: In your opinion, are there any issues surrounding the process to receive an ICU referral from another hospital ?

Locating a bed

Q9: What are the strengths of the phone calls (as opposed to written communication) when receiving an ICU referral from another hospital?

Ask questions / clarify things

Q10: What are the weaknesses of the phone calls (as opposed to written communication) when receiving an ICU referral from another hospital?

Poor referral/ person may not have all details of pt

Q11: Are there any additional comments that you would like to make?

Respondent skipped this question

Appendix 26. Excerpts from Anaesthetists' interviews question 4

"…70 yr old gentleman, found unconscious, knocked down by a car, GCS was 15/15 when ambulance crew saw him. In the ambulance he deteriorated. When I saw him in A and E his GCS was 8 his pupils were unequal, straight away I intubated did a CT scan and he had a sub arachnoid, sub-dural haemorrhage. We sent the CT scans to you, he is optimized, on inotropes, has a central line, art line, catheter, ng tube, everything. So what's your opinion Dr.? Sometimes they say OK bring him ASAP sometimes it is futile, and then we will tell the relatives the prognosis is very bad and that's why we are not doing anything and so no need to transfer. Why he was admitted to A and E, What did we do so far, What are the reasons for patient transfer, There may be no bed. Patient may need renal replacement therapy, or PCA-percutaneous, then he will contact his consultant on call, then he will let me know. He may say we have no beds available and there is no patient that can be transferred out at this moment"

"*Patient condition, all the details, time consuming also, most of the time the transfer is needed for a patient in resus, but sometimes we need a bed for patients who need dialysis or ECMO so you need to discuss the patient in detail. If the patient is in ICU you need to explain what has happened during the time in ICU."*

"Patient diagnosis, history, treatments received, reason for transfer."

Interviewer: "Anything else?"

"*Full history, investigations, what is he on, they will do their best to accommodate the patient, we may have to wait 6 hours. Sometimes we might do a swap, this has been done if we are desperate. It is difficult to take someone down the country, for the family. We take into consideration the social circumstances."*

"*The current situation, why we need the bed, what treatment they are on. Obviously if they are in a position to accept the patient we will give them a more detailed handover of all aspects of their care, and we also provide a written account of the patient. If they don't have a bed there is no point telling them about the patient, if they might have a bed I will briefly outline the situation and again normally we are speaking colleagues to colleagues, we are all in the same boat to some extent."*

"*Usually presenting complaint, our working diagnosis, the patient's background, the co morbidities, what we have done with them so far and what we feel they need. And our bed situation obviously unless it's a national service."*

Appendix 27. Excerpts from Anaesthetist's interviews question 3.

"*It takes a lot of time, if there was coordination between all the ICUs it would be quite easy to which hospital has a bed in ICU, and what facilities are available. It takes a lot of time for me to call the reg, for the reg to call the consultant, consultant has to come back..it's a long process. A central coordination would be very helpful. It is not well coordinated. If the patient has a head injury we will send the scans to Beaumont, once the surgeon sees the scans and says yes, we have to send the patient as soon as possible. Then there is no delay, we just go. Many times I have transferred the patient directly to theatre, or directly to CT scan on the way to theatre."*

Interviewer: "Do you think it is better for that patient to go directly to Beaumont? "

"Ideally. We can't do anything here. Suppose the patient is found with a head injury, they should go directly to Beaumont in my view because we waste 6-8 hours. There is a golden period in trauma, if they see any injuries - head injury, massive pelvic injury, there is no point in coming to this hospital, we don't have an Orthopaedic surgeon or Neuro surgeon. Unfortunately these are the rules, the ambulance crew are supposed to carry them to the nearest hospital available for stabilization. Stabilisation can be done within a half hour and it takes 45 minutes to reach Beaumont. In my experience in Ireland over the past 12 years, they should sort out this problem. If transferred to Beaumont the facilities are excellent and he can be diagnosed and go to surgery. I stead of coming here to be resuscitated and CT scanned, it takes a lot of time and causes a long delays".

Interviewee: "Is it ever good to come to a nearby hospital?"

"If pneumothorax may be good to come to nearest hospital. Otherwise b/p can be protected by putting in 3 or 4 cannulas and give fluids and by the time you optimize the patient he is in Beaumont."

"Takes much time and effort, wastes time. Minding a patient alone in the middle of the night is an issue. During the night mistakes can happen, we are not fit enough. We can open recovery and leave the patient there until the morning when you have many people, instead of very tired staff going on a trip with critical patients. In A/e nurses are not trained to manage an ICU patient with many infusions. So we request an ICU Nurse. We feel the risk because we have to leave the hospital uncovered until the consultant comes. Sometimes the risks outweigh the benefits. It can be risky at night. If the patient can wait, non-urgent , we shouldn't take the risk. But we can manage a pt. with exacerbation of COAD. We need experienced doctors, either a

consultant or non consultant. Unfortunately the work over the weekends and the night is done by locum consultants. Sometimes you feel they are inappropriate. One day I called a consultant, he said, where is ....I can't describe.. it has reached this stage. The other issue is, I need …last patient I had I said… I need to go to the bathroom, I was 6 hours on my feet, I am a human being. Generally, the consultants are not there. They should come for 4 or 5 hours to give relief to the registrars. Instead a locum doesn't come to the hospital, there are inappropriate intubations. In other hospitals they might say no, in the UK they might say no. The cost and the outcome is studied. If people gave their opinion they would say no. Any administrator can coordinate. Regarding treatments needed the primary consultant will make the decision."

"It is so time consuming, it is a huge issue. It takes such a lot of time for the anaesthetist to ring all the hospitals and it can affect the other patients, the patient care. The Anaest is on call and I'm supposed to look after all the pts in ICU and if I'm on the telephone for 2 hours, it is definitely going to affect the pt care. During that period of time my job is an operator, to ring all the hospitals just to look for a bed. I might explain everything in detail just to be told that there is no bed. We have to explain the whole thing and then be told, no sorry we don't have a bed, or if we have a bed we will let you know. It is a very time consuming and very frustrating job. They like to know what the pt prognosis is, there are other factors as well, if it is the last bed. Sometimes you could be lucky that you ring the first hospital and get a bed, but it is unlikely. or you could 2 hours on the phone, so it depends, If someone has a massive bleed and the prognosis is really poor and if they have only one bed, they are reluctant. It is complex, indirectly they can say no, because they know one bed would be taken over by someone who has a very poor prognosis."

"Yes, We could in any one case …if the ICU is full…we can spend hours. We usually get an answer…all the units are in the same position, all the units are helpful. So if I ring my colleague in the…or … they will either say yes they have or no they haven't. If we can't find a bed then we will have to see if there is anybody we can discharge, if not we take them to theatre and ventilate them there and keep one of our registrars there with the patient. That sometimes can take 12 24 hours whatever length of time until somewhere a bed is freed up to get the patient into. It is a huge problem, because quite clearly there is not enough ICU beds for the demand so there is a continual problem every single week there are issues. At the moment we have patients waiting to come here from other units for a higher level of care or treatment. There is not a day goes by where we don't have difficulty with sourcing or finding a bed for a

sick patient on the ward. Sometimes we have to discharge a patient earlier than we would like, to accommodate a sicker patient."

Interviewer: "Have you concerns about premature discharge of those patients?"

Yes absolutely, it is common that I would send out patients that I would prefer to hold for a little bit longer. We keep an eye on them but there is pressure and there is not enough beds for the patients. And it is difficult to juggle that."

"*More often than not it is a futile exercise".*

Interviewer: Do you ring just around Dublin or do you ring around the country?

"It depends on what the patient needs, and if it is something that requires a neurosurgical intervention then the patient has to go to Beaumont. Then Beaumont are obliged to take that patient."

Interviewer: "Do you find that sometimes you need to explain the patient details over the phone and then be refused?"

"That's always the way, people are guarding..every hospital is at near full capacity and if they are to fill their last bed with an external patient it would want to be someone who actually needed to come. So that's why you need to go through the full history. Usually they don't have a bed so it's not an issue. To be honest I haven't had to ring around in this six month job externally because we often manage to shift people around…we have a PACU which isn't really an ICU but we are using it as an ICU. There tends to be musical beds and we usually get patients to PACU, and sometimes it means discharging patients to the ward that may be better off in a HDU environment first, and that's the same everywhere. We explore the potential for creating a bed. Apart from ringing Beaumont because of head injury I haven't had to ring around this six months. "

Appendix 28. Excerpts from Anaesthetists' interviews question 5

" *The patient will come to recovery in theatre and then in the morning they will look after the issue. That's a last resort. He won't be left in a/e if we don't find a bed*."

"*The only way possible is to ask the nursing staff to ring other hospitals at the same time, otherwise there is no way to speed it up."*

"*It's personnel, If I know a consultant I might ring him, because he knows me and he knows when I am desperate. Sometimes certain decisions can be made quickly if you have support. For example If Beaumont says this is a hopeless case, We can then manage a condition which is almost futile with dignity. Sometimes we have discussions such as, we have a patient who is intubated and we need a bed, but the patient may need brain stem testing, or organ donation. Most likely he is not going to make it. The decisions are made with me, the relevant team, the consultant. In the middle of the night, there may be a junior doctor in the other hospital, so it is difficult for them to decide. Sometimes the locum consultant does not even know where our hospital is. He will always say that the patient is for full resuscitation. Hospital managers talking to each other can speed things up. They make it easy. If we can't find a bed sometimes they can. How they do it I don't know. There is a grey area around who should be called first. The accepting team primary doctor should look for the ICU bed first, it would make life easier and speed things up. The accepting team say in Beaumont not ICU should find an ICU bed before accepting the patient. They currently tell us we can't go unless there is an ICU bed available or we might find an ICU bed and not find an accepting team and so It can go around and around in a circle. We feel our patient needs special intensive care, it should be done there because we are busy with this patient."*

"*To be honest I haven't had to ring around in this six month job externally because we often manage to shift people around…we have a PACU which isn't really an ICU but we are using it as an ICU. There tends to be musical beds and we usually get patients to PACU, and sometimes it means discharging patients to the ward that may be better off in a HDU environment first, and that's the same everywhere. We explore the potential for creating a bed. Apart from ringing Beaumont because of head injury I haven't had to ring around this six months."*

“If we knew without having to ring around where there was a bed that would save quite some time. It is reasonably easy for a consultant to get to talk with the on call consultant. It depends on the time, if it is at night time I may say to the registrar will you ring or the other hospital’s registrar may say I may have to ring the consultant.”

Appendix 29. Excerpts from Anaesthetistss interviews question 8

"*It's straightforward"*

"It's simple. If we have a bed we have a bed, if we don't have a bed we don't have a bed. Sometimes there is a bed but no nurses to cover that bed."

"No, Usually not if they know our capabilities here – what we are doing and what we are not doing. We don't have dialysis here so we concentrate on that because we don't want the patient to be transferred again to another hospital. I rather accept than transfer, it is easier for me [Laughs]. If we have a bed we will give the bed because this is a patient and he deserves the treatment. I don't refuse. Only for a medical reason, for example a head injury. Sometimes we have a bed but the primary team need to accept first. Sometimes the primary team here accepts first and then ring us. It is easy to accept."

"*It certainly can take quite a bit of time from accepting the patient to the patient actually arriving and there are a whole host of reasons for that. Sometimes the information that comes with the patient may not be as detailed as we would wish, but by and large we will always…sometimes it has to be done very quick so I understand that. If it is a long journey patients can destabilize on the journey and that's a problem. The ideal would be a standardized information template for all these critically ill patients, I think that would be easier, and an electronic one would be easier again so that the receiving hospital has it printed out and ready by the time the patient comes." Interviewer: "Do you require x-rays"?"*A lot of the time we would reimage the patients if we were concerned."

"In this hospital they have usually rung a primary team and they will have accepted and then the primary team may come in and inform the ICU about this patient who is waiting for the bed and the sending ICU will be ringing as well. We have a board where we put names of patients pending, they would be patients in different ICUs locally but need a specific primary care team here. We often don't have a bed, so we keep them under consideration but we often don't have the option to accept them straight away. Usually we will hear about them several times. The ICU will be ringing us, it can go on for days."

Appendix 30. Excerpts from Anaesthetists' interviews question 6 and 9

"They are immediate, writing takes some time. With a phone call it is an advantage that you can get some advice."

"*It s the only way. It would be useful to know that a hospital has a bed instead of talking with the whole country. Then we can ring and talk in detail, instead of talking with everyone in detail. These people who are being transferred are very very sick so sometimes it helps to talk to the person and let them know. You can give them numbers, but sometimes the numbers don't tell exactly what the patient's condition is. The numbers are different to the patient sometimes. The numbers don't always give a clear picture. You can send all the details, you can discuss anything extra. Interviewer: "Should it be mandatory?" "No, at their discretion. We shouldn't put everything as a protocol, if they have any specific needs to be discussed."*

"*The phone call is easy, rather than writing a letter and faxing it, and then we ask again, and then..we won't finish. Paperwork doesn't work. An electronic system which tells us where there is an ICU bed available would be very useful. There is a time factor involved in calling inappropriate hospitals. It is like a lotto. Sometimes we call ten hospitals and things can change quickly. If there is a centre telling us the number of beds in appropriate hospitals, it will make a real difference. The phone call is the only way to discuss the patient. For example if I text you now, you may not respond. With the phone call we are head to head. [Laughs]. You get my point, It is easy. If there is a system like Skype where I can talk to him and he can see me and I see him and he can see the patient, YES. An electronic system like Skype would be easier. Interviewee: Do you think for proof of information exchange, electronic is good? To document things wastes time. We have a serious patient, we want to go, it will delay us. It has not happened to me that someone said I told you that when they did not. We know that we are doing the right thing. For example, I know that each drug has to be given; it is not practical to sign in the ambulance."*

"As long as the relevant information is transferred but the phone call can be useful for both sides. Ideally in places like Dublin you would have a central coordinator, if the HSE had in place a critical care bed coordinator, then all one would have to do would be to ring them and they would know the availability around the city or elsewhere and say look there is a bed here there is a bed there, and that would certainly be helpful. Would you need to talk anaest to anaest in that process? It might be enough, it might be sufficient to transmit the information

electronically. It would depend on the system. There may be some patients where it would be easier to communicate verbally. But it would just depend on what kind of system alternative was available for relating the relevant information."

"*You give the person the opportunity to ask questions, a more detailed picture of the situation. With a written it may not reflect what has happened at all so you get opportunity for a fuller disclosure of what has gone on and what the patient situation is….. I get the opportunity to ask the things that I want to know about that patient. So that we and the nursing staff can get ready for accepting that patient. To ensure that everything that I want to know, it would have to be something extensively written. You want a full hand over basically. And also you want to be sure that the patient that you are accepting really needs to come to your unit. They could be managed just as well where they are. I think it is helpful to have a discussion, I think if you have it written down it would have to be extensive and then it doesn't leave options for questions either. Interviewer: "Would it be helpful to have some clinical information pulled out of the ICU e system into a template?" "It might be helpful but it might not come across in a very readable form. For example our isip might give across a whole load of numbers over days and days whereas really you just want to know an overall trend and what they are like now."*

Appendix 31. Excerpts from Anaesthetists' interviews question 7 and 10.

"If documented can't change it. writing is time-consuming but more foolproof."

"The only thing I don't like about phone calls is having to make them without getting a bed. I have no problem talking with a doctor or a nurse for an hour, explaining the patient's condition, knowing the pt is being transferred. My main problem is talking about the patient, not knowing if the patient, will get a bed there or not. It is a waste of time, if you don't know if the pt will get a bed or not." Interviewer: "is not having a record of the phone call an issue for you?" "We should document our conversations…this is also time consuming."

"*You should prepare yourself for talking on the phone. You should have your documents ready because people tend to forget sometimes, it can happen. There is no time for writing, I am bagging etc. Sometimes I don't get time to write a single thing for 8 hours. The phone only takes 5 minutes. To write takes time to think and write it properly. I can talk easily. I can talk for say 3 minutes, if I had to write maybe half an hour. My concern is that the patient goes as quickly as possible rather than writing anything."*

"The only thing I don't like about phone calls is having to make them without getting a bed. I have no problem talking with a doctor or a nurse for an hour, explaining the patient's condition, knowing the pt is being transferred. My main problem is talking about the patient, not knowing if the patient, will get a bed here or not. It is a waste of time, if you don't know if the pt will get a bed or not. Interviewer: Is not having a record of the phone call an issue for you? We should document our conversations…this is also time consuming."

"*Usually you would write in the notes phoned such and such and no bed available. That is down to the person making the phone call. The record is in the notes somewhere so I suppose it is difficult to find. There is not always time to write down a full account of every single thing that was said."*

"*Being able to find the person you want to talk to. A discussion can help but most of it is reasonably clear cut. A standard electronic referral form would make life easier."*

Appendix 32. Charge Nurses' on-line responses - Question 3

Charge Nurses April 1st SurveyMonkey

Q3 Whom do you contact to coordinate/facilitate the ICU inter-hospital discharge process?

Answered: 7 Skipped: 0

#	Responses	Date
1	Ambulance. Anesthetic. Medical surgical radiology nursing admin	5/29/2015 11:43 PM
2	firstly med or surgical team to accept patient liase with nursing management both hospitals	5/27/2015 10:10 PM
3	ANAESTHETIST, NURSING MANAGEMENT, M.I.C.A.S IF AVAILABLE OR AMBULANCE DEPT, ICU OF RECEIVING HOSPITAL.	5/23/2015 7:17 PM
4	The nurse manager of the accepting hospital,Ambulance services,Nursing administration,medical team,anaesthetic team,if infected,infection control team.	4/15/2015 10:36 AM
5	Charge nurse in expecting ICU and/ the nurse that will be caring for the patient. Ambulance control centre. Bed Manager/ CNM in charge of hospital.	4/9/2015 12:22 PM
6	Bed manager in both hospital. Ambulance service Recieving icu	4/8/2015 6:46 PM
7	Anesthesiologist on call, medical or surgical team to do the transfer letter, nursing admin, bed manager, charge nurse of the receiving hospital and ambulance team and radiologist.	4/8/2015 6:31 PM

Charge Nurses April 18th SurveyMonkey

Q3 Whom do you contact to coordinate/facilitate the ICU inter-hospital discharge process?

Answered: 3 Skipped: 0

#	Responses	Date
1	the accepting ICU nurse in charge. The MICAS driver, internal anaesthetist consultant re transfer staff,	4/24/2015 4:26 AM
2	MICAs paramedic cnm in receiving hospital consultant anesthist in MICAs hospital cnm in primary hospital	4/22/2015 12:38 PM
3	I contact the MICAS control room, the anaesthetic reg and CNM of the other hospital, the ICU consultant of our hospital and the the registrar of the team the patient is under in our hospital.I also discuss the transfer with the nurse who will accompany the patient.	4/22/2015 5:11 AM

Appendix 33. Charge Nurses' on-line responses - Question 4

Charge Nurses April 1st — SurveyMonkey

Q4 Can you describe what you discuss with each person when coordinating the ICU inter-hospital discharge process?

Answered: 7 Skipped: 0

#	Responses	Date
1	Time illness of patient	5/29/2015 11:43 PM
2	patients condition availability of bed why bed needed eg specialist treatment or no could just be no icu bed available at time of need for that patient	5/27/2015 10:10 PM
3	1.Importance of transfer and why. 2. If patient ventilated or not, this would indicate level of expertise needed to transfer. 3. Condition of the patient. 4. The level and amount of equipment traveling with patient.	5/23/2015 7:17 PM
4	the infection status if isolation is required,the condition of patient,drugs to be kept ready,ventilation mode,time of transfer,team that has accepted patient,	4/15/2015 10:36 AM
5	The CNM/ nurse to care for patient will be given detailed systematic.handover over phone on patients condition from head to toe. What drugs patient is on and what type of sedation and analgesia. Family status / next of kin. Any other relevant information.	4/9/2015 12:22 PM
6	Bed management re a bed being available. The icu nursing staff re patient condition, history and current treatment and ventilator settings, ambulance staff re availability if an icu ambulance, nursing administration re staff leaving to transfer switch with regard to collection of staff by taxi	4/8/2015 6:46 PM
7	If patient is intubated and ventilated and needs portable ventilator, sedation and inotropes needed for transfer and full information about the patient.Present CT Scan and Xray plates from radiology dept. Laboratory results if patient needs dialysis.	4/8/2015 6:31 PM

Charge Nurses April 18th — SurveyMonkey

Q4 Can you describe what you discuss with each person when coordinating the ICU inter-hospital discharge process?

Answered: 3 Skipped: 0

#	Responses	Date
1	Patient condition, timing of transfer, bed availability, availablity of staff to transport and receive patient	4/24/2015 4:26 AM
2	is bed available, who accepted pt, reason for transfer, condition of patient, does patient warrant MICAs transfer, what drugs patients on, lines/chest drains/spinal/cardiac issues/	4/22/2015 12:38 PM
3	I tell the registrar that their patient will be transferred out imminently. I tell MICAS that we have an ICU patient for transfer to the XXX hospital. I discuss the transfer with the consultant anaesthetist as they must arrange a registrar to travel with the nurse and patient. I discuss the patients condition and needs with the CNM in the other hospital and I inform the nurse that the patient will be transferred and drugs and paperwork must be prepared.	4/22/2015 5:11 AM

Appendix 34. Excerpts from Charge Nurses' Interviews - Question 2

"The needs would be divided into different areas: First and foremost, the patient has to be stable, you're going to have to have full information regarding the patient and will need to know how stable the patient is for transfer. That will involve the anaesthetic team declaring the patient fit for transfer and that might involve areas such as their ventilation needs, their haemodynamic needs and also whether or not the patient needs to be transferred in an intensive care ambulance. We then look and see what ambulance the patient needs to have. If the patient is fully ventilated and on a lot of haemodynamic support the patient may need to be transferred in the MICAS (mobile intensive care ambulance), if this ambulance is available. This would be the most, I suppose, beneficial means of transfer for any ICU patient but it is often not available. Having decided on the mode of transfer that is best suited to the patient then I need to know who is going to travel with the patient. If the patient is ventilated it needs to be an anaesthetist if the patient is not ventilated it may be a member of the primary team be it surgical or medical and obviously a nurse will need to go. The needs of the nurse need to be taken into consideration as well, you have got to decide if the nurse has transferred a patient before and if the nurse is familiar with the equipment being used in the transfer and also is she capable and confident to deal with any emergencies that might arise. So that's your nurse. When we have made all those decisions and have decided that a MICAS ambulance is needed I then need to find out where the micas ambulance is situated currently. This involves ringing any of the four major hospitals-the ambulance can be sited at any of these hospitals. We just need to ring one of these hospitals to find out where the MICAS ambulance is and then the anaesthetic team take over and will ring that particular hospital and liaise with the micas and anaest. On call. I should say that this includes getting a primary team in the receiving hospital to accept the patient."

"I'd make sure that they are accepted by a team, and that our anaesthetist is prepared to transfer, do we need to get micas or do we order an ambulance ourselves. I would send a nurse and make sure the nurse is post ICU trained, so she would go with them, and that they are competent, depending on the needs of the patient as well I suppose. I would organize the ambulance to transport and then I would have to get the transport back for the nurse and the anaesthetist."

“We need to know which hospital has accepted the patent, is the patient accepted by the other hospital, do they have enough equipment or facilities which the patient requires. We need the ambulance, does the ambulance have enough equipment for the intensive care patient. The patient needs a doctor and nurse to accompany the transfer. When we book the ambulance we need a specific time when we will be leaving from here and what time do they expect the patient to arrive in the other hospital. You need to provide all the data on the patient.”

“Is the bed actually ready in the accepting hospital, Is there an accepting team and the name of, transport itself – the availability of or is it a micas transfer and is micas available. It’s just coordinating the times predominantly, once you have all that then it is just liaising.”

“I would phone the hospital where the patient is being transferred to find out what’s their bed status because the patient could be accepted that’s all fine by medics but it’s very important to nursing staff and the nurse in charge to find out what exactly is their status. Is there a bed vacant. I’m going to give a handover on the patient, i.e has the patient any infections, do they need to be isolated or different hospitals have different protocols for particular infections like esbl what their local policy is. I’d give them a brief on the patient I’d tell them about their stay, the condition of the patient before we discharge them what lines they have in place whether intubated or not. Find out who the accepting team is. Get onto ambulance control, organize the ambulance, co ordinate the time, if it is a ventilated patient make sure it is a particular ambulance that has the 220 voltage to take all our equipment. Speak with the nurse at the bedside, make sure all the paper work is printed speak with our docs and the primary team to write discharge letters, photocopy them, speak with radiology to put any x-rays or cts onto a cd that would go across. Find out what time the ambulance is going to arrive, make sure the patient is stable enough, put the patient onto the trolley, make sure we have all our paperwork, that we have an anaesthetist to transfer the patient and a member of staff. Confirm with the hospital that we are departing our hospital and an estimated time of arrival.”

“I need to have all the patients data such as the patients ID, addressograph and I’ll collect all the documents as well as the clinical notes and I’ll take a copy, and all the interventions reports such as radiology results and lab reports. I’ll make sure the doctor has written the transport letter as well as the nursing transport letter. I‘ll make sure the receiving nurse who is going to be in charge knows everything about the patient. I need to get the ambulance availability and the availability of the anaesthetist. If the patient needs a blood transfusion on the transfer I need to let the lab know about it just to get everything ready. Check that all the

equipment - transport monitor and equipment is working well, that's included in my responsibility."

"Is it a MICAS transfer, who's on, what time are they available. If it confirmed that they are a micas then we would liaise with the hospital that we are transferring to, to tell then what time we hope to do the transfer at and the nurse looking after the patient would prepare a report and we will prepare our documentation. Confirm that micas have the appropriate equipment as well, are the family and the patient aware. Their infection status I need to tell them, and any specialist needs - say a spinal injury."

"When the patient is accepted, I need to know ambulance and bed time availability in the receiving hospital, availability of anaesthetists, is the nurse qualified for the transfer. Patient information: x-rays, bloods - when will they be back. Ambulance availability. Make sure the vent is there, batteries there, no other CT scan booked or vent may be gone."

" So it is status of patient, availability of the ambulance and availability of personnel are the main issues."

"So first things first, you need to ensure the safety of the critically ill patient being transferred. So if we have micas we have to ring the ambulance control to make sure MICAS is on the road usually if not they will contact us..MICAS being the first second is the bed available in the other hospital? Sometimes you are told that it is and there have been situations where a patient is transferred and the bed isn't available and you are left delayed in ED, so that is a huge resource on nurses and doctors time but equally the stability of the patient is compromised. That has happened a few times absolutely. So literally as you are leaving you need to ring again to confirm again and that you have an accepting consultant, if there isn't one there is bedlam as to who is taking this patient.."

"Generally is the bed definitely definitely available in the hospital that you are going to because we have had some issues on transit where the bed was given away when we got there, we have gotton better at making sure that the bed is there before you go out the door and that the patient is definitely accepted because that could be another issue, they have to be accepted by somebody over there or that will scuffle the whole transfer the ICU Doc may say bring them along but they have to be accepted by a consultant in the hospital surgical or medical and we've had that coming both directions… Is there a bed available, can you get a doctor, can you get a nurse, and all at the right time."

Appendix 35. Excerpts from Charge Nurses' Interviews - Question 10

"Before I can ever can accept I would find out from the anaesthetist, well the very first thing is do I have a bed, that's the first thing, who's accepted the patient, what's wrong with the patient, why specifically are they coming here, do I have nursing staff that can take the patient, does the patient need to be isolated, if they do can I accommodate that need for the patient. I'd phone the referring hospital I'd get a brief overview of the patient. I'd be looking for if they are ventilated or not are they on inotropes? if they were an RTA are their spines cleared? if not then I need to have spinal precautions in place. If the patient needed a particular treatment, for example we are just waiting for somebody for plasmapheresis - that you speak with the appropriate team so that that does not become an issue later on in the night."

"If I have a bed vacant, we need to know the personal details of the patient, their injuries, their ventilation status, their infection status, their stability status- do they need to go to OT as soon as they come in? We need to know a bit about the family - the next of kin, we need to know from the team that is accepting the patient what are their plans for the patient when they arrive? do they need to go for CT or MRI or go straight to OT? We need to know what their HB is, if they need blood we can't use the transferring hospital's blood. We might need to know if they are on any unusual drugs so that we can have them there, pressure areas because we want to know if we need a pressure relieving mattress, any special needs out of the usual requirements? and at what time do they expect to arrive?"

"Prior to the patient coming the status of the patient, the time they are due to leave at, we like a phone call when they have left so we are ready. The state of the patient - if they are ventilated or if they are not ventilated, the infusions that they are on, how stable they are? if they have any infections. The main thing is the status of the patient and the timeframe would be the main areas."

"…If they have lines in, if they are coming for dialysis have they put in the vascath? is there going to be a delay in treating the patient? if there is a delay getting the ambulance they could do a lot of that over there before they come so at least when the patient comes we at least have all the stuff ready to go cause that usually delays it after they get here. If the vascath is in

the nurse can get the dialysis up when they get here. How sick are they? what inotropes are they on? when was the last gas? what drugs are they on? if it could be late when they get here what antibiotics and drugs are they on so we can order something similar. Anything fancy? - any cardiac, feeding TPN, NG? Physio if bad chest...trachy - what supplies...you can then allocate the nurse accordingly. Speak to the team to see are they having any procedures done that day? Citrate for dialysis? size of the patient? Do they need a special bed? Why they are coming, usually a specific reason - surgery, dialysis, when is the surgery?…is surgery booked? we will ring that team-will they have to come today? Find out how sick they are so that we know that they are in the right place, do they need a single room? are they on inotropes? do they have a trachy? do we have replacement parts for the particular trachy?"

"If I'm accepting first and foremost I need to have a bed available in our ICU obviously if we have accepted then we have a bed available. I need to know if there are any infection control needs because I have only one infection control cubical-one isolation room. So I cannot accept a patient unless that isolation room is available-that may mean moving a patient from our isolation room if a cubicle is no longer required for that patient. When I have that out of the way I need to know what consultant is accepting the patient back to …..because the patient must be accepted by somebody, until then they cannot be accepted to ICU until I have an accepting consultant. I need to know if it was a previous patient from this hospital because then I can get the notes that the patient previously had here. And if it is a new patient I need to know, first and foremost what is the need for transfer. Generally the need for transfer is the unavailability of a bed in the hospital where the patient is coming from. So I need to know then, what's the status of the patient, are there any particular infusions that I need to have ready for the patient and has the patient any specific needs in terms of ; does the patient need a pressure relieving mattress, does the patient need a bariatric bed, or is a regular bed OK for the patient. Then at that stage I will have informed nursing administration here to tell them that the patient is coming and I will also have to make sure that there is a nurse available to take the patient from a staffing point of view. All of this should be ironed out before the patient is accepted back here. That's about it really."

"..have we enough nurses to look after the patient, has the patient been accepted by the surgeons or medical team. Sometimes the hospital will ring first to see if there are beds available before asking the anaesthetist, if the anaesthetist has accepted they may forget to get the patient accepted by a surgical or medical team. Ventilation, drugs, care make sure they

don’t need dialysis or in acute renal failure (ARF), if orthopaedic there are no orthopaedic surgeons here.”

“Just to find out the status of the patient, what they actually need just to have the room ready when they get here. Any Inotropes? basically everything, who’s accepted the patient here? what consultant and then find out from them what the plan is?”

Appendix 36. Charge nurses' on-line responses

Question 10

Charge Nurses April 18th SurveyMonkey

Q10 At 9am you need to accept an ICU admission transfer from another hospital's ICU, what are your information needs to coordinate/facilitate this inter-hospital ICU admission process?

Answered: 3 Skipped: 0

#	Responses	Date
1	Relevant patient information, isolation required? , ? beds on our wards to discharge from ICU. ? any other sick patients in ED/wards who may ICU bed first rather than external transfer. Timing of transfer to co ordinate beds and staff	4/24/2015 4:26 AM
2	diagnosis, reason for transfer, have we a bed available, if not are we likely to have a bed later? how urgent is this transfer, is it safe to transfer?	4/22/2015 12:38 PM
3	I need to know what time they are due to arrive to ensure staff are free to accept. I need to know what the patients condition is ,if they need isolation, what drugs they need and any special equipment eg spinal precautions/tracheostomy/dialysis.	4/22/2015 5:11 AM

Charge Nurses April 1st SurveyMonkey

Q10 At 9am you need to accept an ICU admission transfer from another hospital's ICU, what are your information needs to coordinate/facilitate this inter-hospital ICU admission process?

Answered: 7 Skipped: 0

#	Responses	Date
1	Time condition infection status staff level	5/29/2015 11:43 PM
2	need all relevant information about patients condition,history and needs time of arrival to ensure sufficient staff nos and what team accepting pation	5/27/2015 10:10 PM
3	Much the same as above ,except we now on receiving end, PATIENTS NAME AND NEEDS - VENTILATOR OR NOT, RELEVANT DRUGS NEED TO BE PREPARED. INFECTION STATUS. G.C.S. STATUS. TIME OF ARRIVAL.	5/23/2015 7:17 PM
4	if patient is intubated,if he requires isolation,which team has accepted him,what time is he leaving from there,what are all the drugs required.	4/15/2015 10:36 AM
5	Bed availability, does a patient in ICU need to be transferred to ward. Are there enough staff available to care for patient. Condition of patient head to toe. Drug infusions required, infection status, next of kin, accepting consultant, and specialists involved in care. Equipment required eg mattress etc. inform Cmn in charge of hospital.	4/9/2015 12:22 PM
6	The patients condition and their treatment requirements, their accepting team	4/8/2015 6:46 PM
7	Full information about the patient, ventilator settings, sedation, inotropic support, if isolation required, recent procedures done, medications needed.	4/8/2015 6:31 PM

Appendix 37. Excerpts from Charge Nurses' Interviews - Question 17

"First we need to find out what ward the patient needs to go to. If the patient needs further non-invasive respiratory support within the hospital then they are limited to go to the respiratory ward within the hospital. So we have to wait for a bed to become available in that area. I need to know how speedily I need to get this transfer done, if a patient is awaiting a bed from OT or AE then this TF needs to be done quite quickly. I need to ring the bed manager in the hospital and follow that up with maybe a visit to the bed management's meeting. So I need to ask the bed manager to source a bed in the given ward. Her questions will be ye know; what's the status of the patient, what's his/her dependency level and what ward should he go to. Does he need to go to CCU for more monitoring, if the patient has an arterial line in situ he needs to go to icu because arterial lines are not accepted on a ward. Has the patient any infection control issues because if he does he needs to go to a room. The infection control team may need to be involved at this stage as well because if there is no room available in the hospital we need to ask the question can the pt. go to a six bedded area by the sink."

"First thing is you deal with your admissions department and find out is there a bed available? where is the bed available? You'd make contact with the ward, you'd speak to the nurse in charge there. Yes there may be a bed available but there may be a time delay on it. If it seems like an unreasonable time delay you would link back with admissions and say look yes you have identified the bed but it appears to be taking a very long time and you say - can you speed this up a a bit?"

"Bed availability, appropriateness of the ward, the equipment avail on that ward if they need BIPAP at night, if they need trilogy, trachy care, monitoring post cardiac care, they may need telemetry and there may be no telemetry boxes available for the ward so they may have to go to CCU."

"You need to know when the bed is available, that it is the right bed location, if they need monitoring, suction that type of thing and just whatever time the ward will be ready."

Appendix 38. Excerpts from Charge Nurses' Interviews - Questions 5 and 9

"From our point of view the first issue is the availability of beds and that is a huge issue from our point of view particularly renal beds for patients - we find it very difficult to get a bed and could be waiting a number of days during which time the patient's condition may deteriorate and this has a big impact on our ability to deliver care to the patient-optimum care and it is also very difficult from a family point of view because the family are aware that the patient needs to be discharged and they are also very eager for the patient to be discharged – obviously and time is a huge factor. This I suppose does create a dynamic in the unit which is sometimes difficult to control. That's one of the issues-the transport issue itself is not a problem apart from the availability of the MICAS - is potentially a problem- MICAS is only available Mon-Fri and it finishes really at about 3 in the evening and with a MICAS transfer the team should consist of a registrar funded from the on-call hospital where the MICAS is in situ. On occasions we have found that there is no registrar available or no nurse available to travel on the micas and we've had to supply the nurse or the registrar and I suppose that does present a problem. From our own transport point of view the biggest issue - which is a huge issue is the facility on the ambulance trolley for the equipment that is needed to transfer the patient - is a huge risk, and having done a number of transfers, taking a patient with a number of infusion pumps sitting across their abdomen or along their side and putting a ventilator on the floor of the ambulance is less than ideal…often on transfer you would literally have to take away blankets to look at infusion pumps to alter infusion pumps while in a standing position in the ambulance - it's less than ideal - it is quite dangerous. The difference at 6 O 'clock in the evening is that there is no MICAS available first and foremost so our transport at that stage is the national ambulance service so as I explained earlier the issues with the ambulance trolley come up…At 6 pm when we are going to Dublin we are facing traffic problems as well and sometimes we need a Garda escort on the way up which is organized by the ambulance service. Really everything else runs the same way. The same staff are available and the same staff are available in the receiving hospital. The only thing is, we don't have the backup of senior management in the hospital at that stage, however the charge nurse can make the phone call to the director of nursing but they are not available in the hospital as such."

“Trying to get an ambulance time and a bed time - you could be accepted into….and they say they have a bed at 2 o’ clock, you can’t pre-book your HSE ambulance so when the bed is available at 2 o’ clock you have to ring for an ambulance and you’re waiting for a blue light ambulance, can’t book MICAS because you have to book MICAS before 12 o ‘clock and there has to be a time. By the time the ambulance comes it could be 3 hours, then you have to ring the accepting hospital to make sure they still have the bed - the bed might be gone. If a patient comes into the ED the bed might be gone, they don’t hold the bed. The ambulance timing would be the big thing. After 6 pm you would have no hope of getting the MICAS so you have to get your own ambulance, you have less staff at night - only one anaesthetist, you would be coordinating to let the medical registrar know that there will be no anaesthetist in the hospital, you want to leave a senior nurse on the unit if you are going with a transfer, you might have to swop around who is looking after the patients.”

“If it is MICAS they would ring to say are you on call for MICAS and let us know the patient status, recently we have had to decline the MICAS service nursing wise because we have not got the staff, so if for example they had to transfer a patient up from … we would say you can have the ambulance with the anaesthetist but we do not have a nurse, you have to do it yourselves. MICAS is gone off the road from 4 O’ clock in the evening so it would be just an emergency ambulance. We don’t ring until we are ready to leave - you can’t plan an ambulance in the evening time to say you want one at 4 in the morning you have to just ring when you are ready and the problem then is that they are not kitted so you have to bring everything from suctioning to everything, to monitor, you have to bring the kitchen sink.”

“You can't say when the ambulance is going to come sometimes the MICAS is not available and there is a delay of a few hours waiting for the Dublin fire brigade one and you have to make several phone calls wondering if it is coming or not and they can’t guarantee one because they could be all out on calls when we ring, it could be a few hours before you get one. The patient is very sick as well so you are not just transferring them you are looking after them as well, we don’t have much secretarial so you are photocopying the chart and printing out all the stuff and the nurse is trying to look after the patient as well. The skill mix may not be good they could be gone for a few hours, it does leave you short and the hospital short a doctor as well. There is a lot of twoing and froing and phone calls and phone calls and it is very dark ages and you are ringing switch and you are hanging on for 5 minutes while they transfer you and then you get the staff nurse and then she gets the CNM, it’s a very stressful hassily thing when you are trying to send a patient out because you want it to go fast and it’s like old fashioned

communication-you are ringing on the phone trying to track down Mary in charge and you don't always get the same person and you are not always getting the same information and you can still find when you have all that done that the bed still isn't ready…it's very slow ringing the ambulance …in the meantime the patient is sicker…you could spend a couple of hours on the phone just to get the patient out the door. After 6 pm the issues are the same you are now relying on the fire brigade ambulance and they'll come when there are no emergencies, it may not be suitable to transfer at night time, better to send in morning instead of night time with a fresh crew - and Murphy's law, If the ambulance comes at change-over of shift time the nurse gets a very quick handover on a very sick patient and immediately transfers them and hands over at the other end and you are going to lose something in all that handing over so end of a shift is never a good time, but you have to go ahead and send them out, if it is something you have been waiting for.. because that bed won't be there the next day…it adds a certain risk after hours, as much as you could say we are there for 12 hours we are sometimes more tired at the end of the shift. You either send a less experienced nurse out with the patient or leave a less experienced doctor behind, either way it is not a good scenario.

We have had patients deteriorate on the trolley once we moved them, rolled and turned and put on the trolley they desaturated or the BP doesn't like the move and you could be the one delaying it then because the patient is now not quite well enough to go and the ambulance crew are not chuffed about that because they are delayed. It is a case of just take it as it happens, and there are 101 other things to do at the same time. You are trying to coordinate staff to get the patient allocation right, you're on the rounds, you are doing all of this and you are twoing and froing to the phone in the meantime, it is distracting..if you are in a busy unit..if it was dead quite and there is nothing else happening - but when you have sick patients you can't just focus on the one that is going out the door, you have to be looking at what is going on with the other staff and the other patients who aren't going anywhere, and you are getting 50% of everything done rather than all of everything done so it is distracting, it is just the way it is.

We use Dublin fire brigade if there is nobody in an accident at that moment they might be able to send you one and they usually arrive in the door without you knowing that they are on the way, the ambulance doesn't have the proper layout for an ICU patient it's for general patients and you could have somebody with chest pain and you have got them up against one side of an ambulance with lines trailing the other way not like the MICAS which has it in the centre, they are very narrow and small when you are trying to get somebody in who is very sick and

the trolleys are narrower and then there are issues with bariatric patients we have one special trolley for the bariatric patients and before we had to send some special trolley because the patient wouldn't fit on and there was a big delay, it's not the ideal. Now the bariatric thing is becoming more common, the trolleys are very narrow and people are getting more and more obese these days so if you are trying to strap a patient onto a trolley they are barely contained on it with all the equip you have to bring and if you are not bringing a person on a MICAS ambulance there is a lot of equipment that you have to transfer which then has to come back. You are sending a nurse and a doctor out with a ventilator, infusion pumps with no way of attaching it to the trolley its not the same system as on the MICAS which is a stacking system and you can slot things in easy and you can fire all the equipment in easy and transfer it over. In the regular ambulance you have to expect the doctor and nurse to carry all this into the ambulance and then come home in a taxi carrying a portable ventilator and maybe 5 syringe pumps, 2 infusions pumps and a monitor - its ridiculous. 2 people have to then get all this stuff from the ICU into a regular taxi which is going to bring them back to the hospital they won't be getting the ambulance back."

"The MICAS is office hours so the transfer may not take place outside those hours which means that my staff have to go out with the patient, for that I've got to arrange transport back to the hospital. I have to arrange taxi dockets for them to come back and to ensure that the equipment comes back as well. This can be difficult because sometimes staff may be delayed going home, so they may have to make domestic arrangements if they are going to be late off duty. If it is out of hours we need to make sure it is an appropriate ambulance that it is a cardiac ambulance but they may only send a standard ambulance that wouldn't take ventilators and pumps. After 6 pm it is more hassle for us because it is break times and we are down a nurse, there could be something wrong with the other patients - it may compromise the other patients. The staff may not be experienced in doing the transfers are more than likely late off so they need to get time back."

" The bed availability in the other hosp - sometimes you are told that it is and there have been situations where a patient is transferred and the bed isn't available and you are left delayed in ED, so that is a huge resource on nurses and doctors time but equally the stability of the patient is compromised. I suppose our biggest problem is you can never trust anybody on the other side of the phone you have to do that input yourself to make sure you phone that unit you make sure that bed is available and that nobody is going to slip somebody in there while that transfer is occurring that would be the big thing. The bed could go inadvertently while you

are in transfer so it is really important to ensure that if that patient has been accepted that bed stays. Doctors have to accept as well the benefit factor of transferring a patient, is it really in the patients best interest to be transferred to a premium bed and maybe the inappropriateness of transfer where we really need to look at the critical nature of patients being transferred. We get a lot of patients coming that you think God did they really need to, is this in their best interest. It's hard to know - admission criteria is a very ethical issue, I know in other countries they have strict criteria about who gets that last bed, we need to be ethically a little bit more questionable of what's coming in and that people make their opinions felt that people aren't afraid of this kind of legal system that is so archaic and binds us to well you must do this because this is our legal or ethical duty, I think the law will have to change in time because the beds are so premium and we just don't have enough critical care beds in Ireland and that's a fact and our population is much sicker and aging and we have more social problems and the amount of alcoholism we have in this country - those type of patients in our critical care beds are draining our resources and to what endpoint. There are a huge amount of social issues that again dictate the beds that we have. You have to give everybody a good shot but if they are not improving - but that is a whole other end of life decision making, but again that type of patient could come into the transferability from hospital to hospital again using up resources of very precious resources where really they should be taliated - proper quality end of life issues in their own hospital. We have loads of scoring systems in place if you were to APACHE or SAPS everybody you would probably say well what's it all about, we may as well shutdown because the end result would be the same but at what point do we have to make appropriate decision making for the bed resources that we have where we have people crying out to get to an ICU and they are not coming on time and that's where trauma patients that need to come …you need to get patients to the trauma centre as quickly as possible. So with good treatment they should do well but again they are blocked because beds aren't available and the longer they are left in smaller peripheral hospitals they are not getting that optimal care that they would in speciality areas. I could go on forever..it's a whole systems change really, maybe with the development of the trust things will work better, they can look at their collective beds and say right we have x amount we need to utilize these in a more delicate way.

If the last call isn't in by 3 pm that MICAS ambulance isn't available thereafter so that is only mon-fri 7-5 type timing so after that then you have the whole process of the difficulty of getting an ambulance service, you have to book a special ambulance and if you don't have the MICAS you don't have the same familiarity with the equipment and personnel so it does make

transfer a little bit more dangerous let alone uncomfortable. If at all the MICAS works well in that respect in that everybody is very comfortable with that system it is a brilliant system for safety, but again you try and organize and it's that whole organizing..because I suppose as that day pans out then, you may not have a discharge until later in the evening but if you can get that transfer done before 5 with the MICAS it makes it safer."

"Usually it's the ambulance and like that it's to get the ambulance for the transport trolley. There is a breakdown because there is a specific code for that ambulance and unless you get the right person in ambulance control they don't know what you are talking about and they divert you to the 999 service, which is a complete waste of time and you end up ringing back again and that's the type of thing. The people on ambulance don't realize the difference between - just trying to get the right ambulance causes a delay. "

"We would normally put them onto our ambulance trolley if MICAS are not taking them, if MICAS are taking them that's fine if not we have our own ambulance trolley that we would put them on. It's a safety measure for the syringe drivers and all of that so they don't go flying off. We did have a discharge one night where the ambulance was too small for the trolley and it wasn't even our trolley was too small, they wanted the patient to sit up and I said no the patient can't sit up and it took a long time to sort that out. We ordered an ambulance and said we were coming from ICU but when there was a ventilator and things they had no facility for it. So then we had to come back and they said we can transfer them in the morning and I said sorry the bed is gone we are transferring now so you need to come back with a different ambulance because we've ordered the ambulance hours ago, so they did come back. The main ambulance people sent a private ambulance company and the private company weren't equipped. It was a private company and the ambulance wasn't big enough. Mostly you don't come across those issues. The other issue is if you are transferring them back to their original hospital you then have to get a nurse back from…by taxi and it is very expensive."

"The family – there may be issues there, they may have had difficulties prior to arriving here so they may have concerns about transferring down…delays can be an issue very much because it all depends whether they have a bed or not to accept the patient. Ambulance control can be an issue that can take a little bit of time."

Appendix 39. Excerpts from Charge Nurses' interviews - Question 13

"The only issue that we have ever had was that we were not informed that a patient had an infection control issue and then the patient arrived down. That was a major issue when we had no isolation room available - that's a major no. I think the onus is also on the nurse who is accepting the patient to ask that as well as being told- because it creates a major problem. Generally no other problems so long as the patient is accepted by a team there are really no issues pertaining to the patient coming down. Sometimes I suppose it very much depends on the situation but there could be issues with families who don't particularly want to travel and may not want the patient transferred because it might involve extra travel but that just has to be sorted out and it generally is sorted out-there is nothing we can do about that."

"Clerical is huge, trying to get a hospital number is a huge problem because they won't do it until the patient arrives in the hospital, then you have to go down to A and E front desk after 4 pm with all the information. So you have no hospital number so you can't do any bloods, you have no chart for the team to admit them in, that is the main first problem. Then the medical and surgical team coming and accepting them can be just a quick hello and goodbye and they don't give you a clear plan of care, what to do for the night or day. Anaesthetists are ok, nurse transfer - some hospitals are very good at giving information and others are very poor. Some will give nothing just a medical letter and others will give you what the patient has been like for the past few days."

"A few times patients have come here unaccompanied by a nurse which is a big risk factor with an ICU patient, the doc is by themselves. We would never send an ICU patient without a nurse, that's why we wouldn't do a MICAS transfer because we don't have a nurse..it happened a couple of times."

"It is a scrappy process, there is a lot if twoing and froing and confusion. But I think that is just because there is no one definite person, I'll be doing a bit of it to find out the nursing side of it, the doctors will be talking to somebody else about the medical side of it, say about who is accepting the patient they will say oh I already spoke to him on the corridor and he said this this and this so you are constantly having to go back and talk to the consultant or the anaesthetist and say what is the story? Have you heard anything since? And if they don't know

you end up doing the ringing, so there is not really a definite one person dealing with the whole thing there are a lot of fingers in the pie and there are a lot of doctors and nurses chasing around after each other and you always seem to have just missed the call when they have rang back, that kind of thing. I think one definite person that you say listen you talk to the doctors, I don't know if the docs would ever go along with that but just to say you deal with this because at the moment from the nursing side the coordination is the person in charge but the medics are doing their own thing as well, so there are two different paths and depending on how good the anaesthetist is at passing on the information, they tend to go straight to their consultant with it and you hear it back through a kind of a Chinese whisper kind of thing…..Can't get them on the system until they get here, ordering bloods is computerised and they won't admit them until they come in the door so if you want to immediately take blood samples ...seems to be a rule...after hours A and E admit..it is an awful nuisance...if cancelled just delete it...can't even document observations, could be there for an hour without being admitted, observations don't show up as the patient...vitals not recorded... Hanging waiting..if no number can't do anything until they are admitted...documentation is delayed cant chart...it always takes a half an hour, ring up to ask, has become a real nuisance, if doc types in name you end up with 2 patients, 2 hours nothing is documented nothing prescribed…."

"Yes, we have had patients arrived unannounced to us, just wheeled into the room, we didn't know they were coming. Sometimes they come in through A +E … we've had patients that were transferred from our ICU here to another hospital and then they were looking for them to be returned and they were put in an ambulance and to PACU, they have been sent to this hospital when the ICU is full here and they have to be accommodated in PACU…they just sent them, we have done what we can - from an ICU in the city, and had them with no nurse, it has happened more than once. We had to keep the patient here and try and make facilities, we were full and we had to try and facilitate the patient."

"it's usually just the bed availability and trying to keep one, once you have accepted the patient trying to hold the bed. Obviously if the patient is in transit you can't but if it's pending you can cancel it, which has happened."

"Sometimes they announce we are leaving and we say don't leave we don't have a bed and they say we are leaving anyway, nobody has told them they can come. They have been told not to come and they still show up. One night the anaesthetist came up and said that patient has left…and I said what patient nobody has told us, we are flat out we have no ICU beds and

he said oh they have left and I said you need to get on the phone and tell them to go back…Sometimes they just show up in A+E and the primary team are aware but we're not aware and sometimes they just show up at the door and some hospitals just say we can't deal with them…we are sending them anyway because we don't know what to do with them. The consultant said we are not accepting them and they said we are sending them anyway, we are putting them in an ambulance…so then you just take them..so that can be an issue..Miscommunication that's the biggest issues people not telling you that they are coming…

Interviewer: "Is there a lack of national coordination?"

Oh massive, I'll give you an example, a patient arrived from a hospital down the country and they arrived to the door and we sent them to A+E because we didn't have any facilities for them and then when I phoned the hospital and said you have sent a patient here and we have no facilities and you do know that there is a process to follow and you immediately get, I wasn't here I'm the night staff. I said can I speak to your manager and they said there is no manager here tonight and I said that's evident, it's not fair on the patient, it's not fair on anybody really, it would be different if it were urgent and they needed …..for something but often they don't they could have waited until tomorrow…but that nurse ate the head off me…"

"Sometimes we are accepting from outside when we can just about accommodate what we have in our own hospital. We are utilizing what really should be an emergency bed for something from outside. I do understand that we would be a centre that would have specialities but I think we should always have something on reserve for the emergencies that happen in our own hospital we do seem to overextend ourselves, at the same time it is very difficult to justify the capability to admit when someone is being compromised somewhere else. We do push it a little bit too far sometimes. Our bed occupancy would be about 110% way over what it should be. There may be issues…I like to know the estimated time of arrival you have spoken with the people from the referral centre they will have written paper work but it may not always be what it seems. Sometimes where we find a very grey area is c- spine. The orthopaedic surgeon down there may have said the spine is clear and take the collar off here they say leave the collar on until the patient is awake –you can have differences of opinion that way. Estimated time of arrival is not always communicated. I think it runs much better when nurses are just involved in it, because I think what happens is a team be they surgical or medical will look to transfer a patient and they will deal with the appropriate team here. The appropriate team here will say yes we will take the patient, they get all excited and

put everything in place and forget to tell the people who run the beds and the nurses that we have accepted this patient and he is on the way, they are a very important cog in that wheel.. for example, I am going to get somebody down from…this evening, I rang them at about 10 past 5 to say I will have a bed for you as of from now you can go ahead and start prepping the patient, and they said oh we were ready to leave at 6 o clock -I never said we were ready to take the patient, that's because they said yes from a medical point of view. Sometimes there may be too many people involved in the loop."

Appendix 40. Excerpts from Charge Nurses' Interviews - Question 6

"The only things we can do to speed up the process is have all the information available at hand, so to have the blood forms photocopied and ready, echo reports, ECG photocopied and to have all the information there. It's very difficult- there is nothing else we can do-we cannot the process of getting a bed, of the MICAS so a lot of it is outside our control. The only thing we can do is to make sure we have everything ready when the ambulance ready comes really. I suppose from nursing point of view we do advise consultant to consultant discussion because it is easier to get a bed in a hospital when a consultant anaesthetist liaises with his/her consultant colleagues, in an effort, so we would encourage. I have at times had to call on the help of the general manager of the hospital, the director of nursing and nursing administration to assist in phoning hospitals to get a bed and consistent discussions at different levels beit nursing management levels or general manager level has ye know given us beds at times when there were no beds available and families have approached the DOH, we have approached the DOH to get beds, it has become that critical, that the DOH to the level of the minister has been involved to get a bed."

"Keep in contact with the hospitals by phone calls. You are phone calling them you are letting them know what is going on. Then when they ring you back and say they have a bed at 2 you'd ring the ambulance - they may say they have no ambulance available. The MICAS might not be able to pick your patient up at the time you want and the hospital that you are transferring to might not be on for MICAS. So you end up ringing a different hospital, then when MICAS comes you have to handover to a different nurse who is going to hand over to a different nurse so it means that you have to have all your paper work - completely. You have 2 handovers, you are handing over on the phone, you are handing over to the MICAS nurse."

"..you need to have everything ready, the notes, the blood results, transfer letters and make sure that the equipment is functioning"

"ring, ring, ring, ring, ring, ….there is nothing we can do.."

"If the bed isn't available or isn't ready at the receiving side I've very little control over that, all I can do is clarify my urgency and my need to discharge the patient. Delays from our side - you'd identify what was the problem, and then I'd seek help from the site manager if I needed

or my own CNM3, say if there was a problem organizing the ambulance - in general there isn't. Communication, I would just keep going back to the various parties making sure that everybody is clear that we all have the timeframe, and we all know what we are aiming towards."

Appendix 41. Excerpts from Charge Nurses' Interviews - Question 14

"Making the bed available here- if we have an ICU bed available here- which means we have an ICU nurse available, we have a ventilator available and we have a bed space available. We may have to transfer a patient that is ready for the ward out to make that bed available- the onus is on us to take a patient from a hospital where there is no bed available and I think maybe we need to speed up the process of getting our patients out onto the ward. Because we can't do anything until that space is made available. We always have to bear in mind that there is a patient somewhere in an A+E department or somewhere who requires a bed. So all efforts have to be made with bed management as well to get a bed on the ward for our patient if our patient is ready for discharge out."

"If I see any patient ready to go to the ward I can get the discharge forms ready so I don't need to wait to do all these things when the time comes. Staffing issues are the main - if we have a bed and the treatment is available in our hospital we take the patient."

"..preparedness, have the bed space prepared, know what teams you are contacting, ask them to ring when they are leaving so you have a ETA, have anaesthetist and primary team there when patient arrives – not having to wait 15-20mins for them to come to get handover."

"It's usually just the bed availability and trying to keep one - once you have accepted the patient trying to hold the bed. Obviously if the patient is in transit you can't but if it's pending you can cancel it, which has happened."

"…from our point of view there is no delay in bed turnover – one hour is probably the turnaround time for getting the bed space ready, cleaned all of that..getting the bed ready is not really an issue, it is the availability of the bed on the ward."

"You would actively work on it, you are making contact with all the people that you need to make contact with to create the bed for you. You are liaising all the time, the admissions department to transfer somebody out of here to create a bed, make sure you have the nursing staff and if you haven't you have to deal with your own managers to organize it. You are dealing with your own consultant you are getting a clear picture of the patient. You are finding out from the accepting team, you are discussing with them, you are liaising with everybody and linking back in with them."

Appendix 42. Excerpts from Charge Nurses' Interviews - Question 21

"Certainly the discharge hub meeting at 10 am in the morning if the hospital is at crisis stage a repeat one at 3 pm and the facility is there to attend the bed management meeting and there are a number of nurse managers there and obviously bed management so there is that opportunity to discuss these opportunities at that meeting. So at least the personnel are there and you can verbalise your concerns, and that certainly is beneficial, utilising that meeting is very helpful. Other than that there is nothing else really to do to speed up the process. Coordination with the ward and discussion with the ward is the only other way out if it as well cause sometimes this process can take longer than you would imagine simply because the wards have to transfer their patients out to another ward to get a bed available for us. It can be very protracted.

Interviewer: "would you repeat the phone call?"

Interviewee: You would have to repeat the phone call and be very clear that this bed is needed for a patient in A+E and that it is an urgent transfer."

"I need to ensure that the CN knows the importance of getting this bed ASAP. I'll call them directly and explain that I need to get another patient from ED. If there is no availability there is nothing we can do."

"I would always aim to speak to the manager, I think it is the best person to talk to on the wards to get that ball rolling, if that ball isn't rolling fast enough I'll speak to the ADON over that area and let them try and push it a bit more. The bed manager will tell you the bed will be ready or there will be a bed for Joe Blogs but then it's you and the ward discussing on how quickly that can happen. When you are going through a few different people they may not communicate it as well so personally I would always say…who's the manager in charge today can I speak to the manager and then there is no dilution of that information or I didn't know about that…to speak to the manager is key because speaking to 20 other people just doesn't get that level of urgency across using your ADONs as that extra force to move the process and this has been IDd as a big problem - the turnaround of beds so the hospital is well aware of it and you can escalate up if…and it's not because people are just sitting on their laurels there are huge moves around even at the ward level that managers want to put the patient to, so

they might be doing a lot of micro moving in their own area before but - the bottom line is there aren't enough beds for everybody."

"I would deal with the nurse in charge on the ward that I am discharging to, I would deal with the nurse who is looking after the patient on my ward to make sure do we have the discharge paper work done, do we have the lines taken out, do we have them ready to go. If there is a delay at ward level I would say to them look I really need to get this patient out you need to find out is this a genuine delay or can you move a little bit quicker. Someone said to me before we need to sort out lunches, that isn't acceptable you need to get everybody moving. I suppose just keeping the lines of communication open but not be aggressive about it and sometimes it's quite helpful to go down and just go face-to-face as well. I go down sometimes, I think everybody gets a better feel for where each other is coming from and you can understand where they are coming from and here's the thing, if it's getting problematic you would get back onto your site nurse manager or your CNM 3 and say look I've been down I've spoken with them it's taking forever, you need to know we need to come up with another plan and the plan may be to utilize recovery, to put the patient that was supposed to go to the ward in there as a stop gap so we can bring the critically ill patient in, we have to come up with a plan b I guess."

" We have a patient flow manager so that helps, for example, I need to get a patient out to the ward now, we are getting a patient from the west of Ireland so we need that bed for him to come in to. They said they would not be ready until 2 o clock but I want to be sure that the patient is leaving here at 2 o'clock so to speed it up if it's not happening I'll be phoning the flow manager to say can you sort this out we need the bed and they are very good, we used to go to the ward ourselves. If you speak to the manager it usually helps."

"We give admissions a list every morning of our patients for discharge and any special requirements they have – infections, isolation, one-to-one that type of thing- trachys, epidurals anything like that and then admissions are supposed to allocate accordingly to wards. The patient flow manager is more relevant for patients coming through A and E to the wards. We can avail of them to try and speed up the process on the wards, to try and encourage people out."

Appendix 43. Excerpts from Charge nurses' Interviews - Question 7

"I suppose the strengths of phone calling are that any minor issues can be discussed over the phone. There is only a certain amount you can put down on a fax which is generally the only other way that we would do it. We don't utilize any other method at the moment everything is really by phone. We would fax up ECGs that is the only thing really we would use from a fax point of view. The strengths of phoning someone is having a named person for further conversation, it does mean that we can speak to the nurse that is going to be looking after the patient and so as we take the name of that nurse and deliver information that way it's helpful. To get the bed it is the only way in terms of consultant to consultant ringing one another-that is the only way we can get beds at the minute. So I suppose that's the main strength really- any issues that need to be discussed can be ironed out there and then."

"Yes they are better, when you ring it will be quicker."

"A phone call is a direct conversation so if they have any doubts then and there they can clarify."

"Be prepared and they can ask you the question that is appropriate for nursing, usually we write out a very medical transfer letter whereas just nursing instincts you know the way…Over the phone you can say what the family is like, whether supportive, religion - they often say did they have the SOS, the little things that you realize yourself when filling in stuff on admission. Little things are important for the family because it makes it easier for the transfer if they know little bits and pieces about people. Pressure areas - you can say pressure areas are red or intact or well you would probably write that down but you might have said that they are clammy and cold but then for the nurse to see them and ring you back and ask ..stuff like that."

"I think you have to have a combination of everything really, and I think a one to one phone call is very handy for exchange of information and answering questions, you get a feel for the activity in the other unit and are they going to be ready and guarantee the bed. Cause sometimes we have organized for a patient to transfer out then you get a phone call - the bed is gone."

"I think phone calls ARE good, if you could guarantee a set number and getting the right person when you want them… Phone calls are better than written because I can't type for nuts so if I had to type something into a computer with 2 fingers I'd be there forever half of it would probably be spelt wrong and only when I have sent the thing would I realize oh I forgot to include this this and this. Even when we do our reports at handover people are still coming along and handwriting the bits they forgot to type in, ..it is easier to hand write in the last time you gave drugs, you may print out the report 2 hours before the patient goes and in the meantime you have given extra stuff..and the times are different. Phone is more up to date that I can ask there are things that you don't think about until you are saying them, whereas typing it into a system will just have a general template it won't be specific to that patient so there is a lot more..and I can say it a lot faster and they can make a quick note rather than having to print out..if you are looking at something typed nothing really jumps out at you whereas I can ask and give the information in order of priority…same thing with the ambulance crew - this is what I need. People tend to pay more attention to a voice on the phone rather than a screen or a piece of paper anyway, it's quicker, …you transfer a patient to another hospital they are going to get a voice handover supplemented with the paper but the voice is what they are listening to, that is what they will remember, who said what, not everything is on the paper you don't just hand somebody a piece of paper and walk away and say read that, you are going to be doing a verbal handover because verbal is something that people remember before anything else, I don't think you can do away with the phone calls, its a lot quicker, and a lot quicker to highlight something."

"On the phone you get to speak to a person that is accepting of that patient so you have a name you have …if you send a referral in any other format you don't know if it has gotten to the person let alone the right person. It really is key that that senior level of communication is maintained open. So it would be consultant to consultant anaesthetist, manager of the unit to the manager-it is somebody who is in the know and not just Joe blogs the staff nurse who is only there once a week, you can leverage a bit of priority then if the patient really needs to get to you. Interviewer: Do you know the people does that help? Interviewee: Once it is the CNM that you are talking to it does not make a difference cause they are respected they are in the job a while, they will similarly have the same issues when they are transferring so you would have a whole spec of what you need to cover and you know if you are talking to another ICU nurse that you speak the same language and you' loll always follow through that same process of the level of care and what the patient's on and instabilities yada yada yada."

“I think phone calls are good and I would always try to get the CNMs name or even the docs name so each time you would ring you would say Francis or whatever what’s the update? so you have the same link or person that you can tie in with…so either CNM 3 or the CNM 2 one of us would do the role and have the same person doing it.”

“The official written one has to go in but the best thing is talking to people cause it’s easier to explain and understand from their point of view what they need as well.“

“Yes phone calls are helpful. Verbal communication is good, it is quicker I suppose. I find if you are doing anything on-line it just delays it. They don’t necessarily have to move fast, whereas if you are speaking to somebody it is better.“

“Yes, I think it is very good to talk to the person, face-to-face is the ultimate sometimes. Yes I do think that speaking to people on the phone has a lot to offer, I think you can iron out some problems or for example if there is something on a letter you could say can I just question you a little bit more about this and get a little bit more detail about this. Sometimes you know by the tone - you can pick up a lot of things.”

Appendix 44. Excerpts from Charge Nurses Interviews - Question 15

"Similarly the strengths are the quality of information delivered by phone. A lot of the information can be delivered by phone which makes it a lot easier when the patient arrives and particularly the infection control status, the haemodynamic status and what potential infusions you need to have at hand but it very much depends on the quality of the information and the quality of the person making the phone call. There are huge discrepancies between who make these phone calls. It would be useful to get a phone call to tell us when the patient is coming . For instance if a patient is leaving ….it is very useful to know that they are leaving know and will be there in 20 minutes. Because we have to organize out breaks around a patient coming so its important to know when the patient is due to arrive and not just have a patient landed on top of us. Timing is important."

"We are bad at looking at emails, phone calls are on the spot, you know exactly what is going on at that time – real-time. If it was emailed or texted to you in a timely manner it might be OK once there was a warning system with the estimated time."

"Phone calls minimize the speed of the process, as said previously."

"I like both. For me I do like making contact with the referral hospital just to get a general overview."

"You get a better understanding when you speak to somebody rather than when you read something. If you don't go and see a patient and somebody hands them over once you look at the patient you can tell 100% more about them.."

"I think from a nursing perspective getting it directly from the CN or the person who is best in the know and docs will get a different perspective so I do think from a nursing perspective it is good to always get that measure from like with like and then we might share what the doc may have learnt what we may have learnt and so you have a clearer picture."

"The phone call allows me to question something...I feel more secure with the phone call, you talk to somebody definite, you have got a name you know who said what, you are going

straight to the person in charge. A piece of paper you are not necessarily sure who wrote out what on it or how accurate that information is, because even from our own ..if I want to know how a patient is in our unit I can click on the system and look at their obs and go straight up to the bedside and see what's on the monitor in front of my nose you know there is a time lag with printed information, it is not up to date to the second whereas a phone call will tell me now - he's on 5 of norad he's on 100% oxygen whereas what was written on the piece of paper in the five minutes before I got him could have changed. Interviewer: Does one quick visual look at the monitor and while picture tell you a lot? Yes, if I want to know what a patient is on, I think from our computer system which I think has slowed everything down, I click and put in a password and click and clikety clickety clikety click and eventually get through to the screen and see what it says...5 of norad and 2 of fentanyl and the vital signs, or I can just go straight up to the bedside and see it all at a glance, I can see everything without having to go through screens and scroll up and scroll down ...its grand to look back at stuff but when we want to know what they are on right now, it's great as a back track but it is not necessarily the most up to date information because it is just one set of obs and one set is done per hour and that is only an average of the hour, it is not telling you what is happening right this second, the blood pressure could be in their boots...Interviewer: When you are scanning the monitor are you giving the patient a visual as well? Yes, you know exactly what they are like, you can see it and you can get a better picture, by the time I have written that down on a piece of paper anything could be happening with the patient whereas at least if I say to somebody how is he? What's he on? What are his sats? What's his oxygenation? How is his chest? What are the secretions like? I can get that info back a lot quicker word to word rather than somebody going typeidy tyeidy type. Interviewer: Do you think a visual of the patient would tell you a lot of info? It would want to be the best looking screen ever, no I don't think so I'm happy with the information being said in real time, you are not going to see a whole lot....when a patient comes in I want to get a visual of them, looking at them does help for me to look after them but when they are not there they are looking after them so it is different if it is an amassing wound or something specific..he's got this incredible rash we don't know what it is fine show me a picture…also what are the family like, do they know they took an overdose, who has spoken to them? What do they know? Sometimes they are pushing for the patient to come to us.. Do they want everything done? and it doesn't fit on a form. How the nurse has been with that family...who's the next of kin? or maybe they are the next of kin but this one is more sensible, there is a lot more information and a doc wouldn't have that, they are very important things for us because the first thing you are going to get is the family arriving maybe even before the patient, you have to deal with them before ...maybe one isn't processing things

well..there is a very anxious daughter who is very upset who is not processing things very well or there are family issues..better to get that information beforehand...There is a lot of info you get from a nurse that nobody would have written down .., you can get more of a handover rather than just numbers and figures. When they get talking they will bring it all out together, as you're talking things occur to you and then you say that reminds me now before I forget such and such a thing...and they can be a bit stressed and hassled getting the patient over as well and they can be very chaotic - there would be a lot of drama getting the ambulance organised."

"…they can tell you about the family which you wouldn't get in a transfer note."

.." you can relay the urgency better and answer the queries directly, they can tell you about the family which you wouldn't get in a transfer note."

"The phone call is crucial because you can't get the important information and you can ask, if it was a central thing and say the ICU patient was down the country somewhere or somewhere that needs a bed yes to flag it but I think the actual phone call is important to talk to the person who is actually with the patient who knows how stable they are . We could put a flag we've got a male 21 yr old who is ventilated down in A+E with an OD has anyone got a bed but the actual details are most important."

Appendix 45. Excerpts from Charge Nurses' Interviews-question 22

"It is easier dealing with intra hospital transfers by phone because we are familiar with some of the staff on the ward. We can tell them straight any issues, and I suppose that is the usefulness of the phone call we know who we are talking to. From a colleaugeality point of view it makes sense to make that call."

"If you are phone calling the wards themselves you can explain whereas if they just see numbers coming up they say oh yeah this is a discharge from ICU, but they don't actually see that you are actually getting pressure from A+E to get the patient up... If you ring them over and say look A+E are shouting at us to bring the patient up - we can explain that then and hopefully they will do a few bed moves around to get that patient over. Whereas if it is just numbers they just see a discharge is a discharge."

"With phone call you can put pressure on, the ward may say we are very busy and are short staffed, we say It is not routine it is a dire emergency, they lack equip, delay with cleaner, A fire alarm night work [laugh]...people would get used to ignoring. You hear nothing until you ring them. They want to get their workload organised."

"Yes and It is definitely better to go to a CNM rather than a staff nurse, they are less likely to deflect and waste time to try and cover lunches and drug rounds, all that type of thing is seen as a reason not to take an admission whereas they don't see the other end of it – the ventilated patient in A+E has to get in. You can explain the urgency better to the CNM and they would up the impetus."

"I would be a strong believer of just speaking to somebody either face-to-face or phone call I think you would always need it I do really to clarify the points...human contact sometimes has a lot to offer, you can iron out some things."

Appendix 46. Excerpts from Charge Nurses' Interviews - Question 20

"I suppose the big issue is the bed availability, particularly with the huge demands that are now on casualty. A+E beds - I sometimes feel it's not fair in a sense that A+E beds are prioritized and we do have patients here that are ready for discharge out of the unit but A+E patients are prioritized first. Sometimes patients need to be transferred out of ICU because they are ready for transfer and from a psychological point of view it would be better for them to be out on the wards and their progress is inhibited almost in icu because of their fears of being in an icu environment. This is not really taken into consideration viv a viv the patients who are in A+ E and need to be transferred because they are a long time in the A+E department and targets have to be met. So I do find this very frustrating to be in competition with A+E for beds.

This becomes an issue then when we know early in the day that a patient can be transferred and that transfer doesn't happen until an emergency need is identified from A+E then we don't have the staff available for the transfer. So a planned transfer is must easier than an emergency transfer. And I think that needs to be looked at in terms of having an ICU bed available in ICU in the event of an emergency bed being required. It doesn't seem to be the norm anymore. We do have patients sitting in ICU for a protracted period of time who could well be out on the ward. And then in the evening time or even in the night this person has to be moved to facilitate the admission of another patient. Which is wrong in my understanding. That's an issue for me."

"Sometimes you are pushing to get a patient in from OT or up from A+E and they say they are waiting for a discharge so it could be 4 or 5 or 6 hours waiting and then you get fed up and you go over to the ward and the bed is empty but they have to have breaks and they say they aren't ready and the beds are there, they are empty but they are not taking them. Often side rooms are a problem because you have to go through infection control. Infection control controls the side rooms in the bed management meeting you would make them aware that you have a transfer- CDIFF positive or MRSA or whatever, sometimes you have to ring the infection control nurse to see if they are OK to go in a 6 bedded by a basin or do they have to go into an isolation room. If they go into an isolation room are they safe? do they need a special with them? - a care assistant or a nurse. Nursing and bed availability and timing are the

main problems. Timing would be the big thing. ICU doesn't seem to be a priority for discharge it seems to be to clear A+E is the first priority, since they got that new computer system with the times on it they seem to be fixed on that. There are so many patients over 6 or 8 hours so they have to be moved on, often ICU isn't prioritized for discharging patients. The IT system has a huge influence on time..it is like a big eye on the wall ..the HSE are keeping an eye on times and that is their target. We set up an admission policy - 20 mins if bed empty or if the bed wasn't empty to get it washed and cleaned but it doesn't happen…proof that you were waiting for so long would help."

"Delay in transfer - they could say 3 O ' clock and then it could be 6 O 'clock in the evening. You won't blame them because sometimes they are so busy on the ward, If we need a bed here we need to push them - we need to do the transfer quickly."

"Sometimes there is a delay because there may be no bed availability on the ward, sometimes there will be a difference of opinion between the staff members. If the Anaesthetic team think that this patient can go to the ward but the primary team just refuse it, so those kind of issues."

"Sometimes when you are under pressure to transfer somebody out the only patients that might be deemed to go may not even be suitable to go and they are high level of care, that high level of care is then transferred to the wards where you know the wards are understaffed or probably don't have the same kind of numbers to care for that patient so you might have an early discharge to make way for a sicker patient coming through but what you might end up seeing is that patient being readmitted then in a few days time so there is a readmission problem because you are constantly under pressure for ICU beds. They should be in a HDU bed but we have only x amount of HDU beds where there may be little movement.....it impacts hugely on ED, if a patient comes into resus and we don't have beds there is that whole trying to get a bed in another ICU so that is a whole other area of …that patient is not really in a critical care area and could be there for hours and hours and what impact is that having on the patients care …had they been transferred quicker, had they got an ICU bed faster would that have improved their level of care? their mortality? these are all questions that one has to ask…"

“There is a lot of hassle getting patients out of ICU it depends on where they are going but there is usually a delay and that causes a lot of problems getting the next patient in.
It is all awful I can’t make any of it sound better...you tell admissions, they don't always rush, the ward can be quick or slow, you are taking somebody's word for it, hard to get a time from the ward. The wards don’t seem to have a special mattress and have to ring the company to get a special mattress and it can take three hours and then they want to borrow one of ours and we can’t lend them and then they can’t go out until they get the mattress. They don’t seem to have supplies for patients who aren’t very mobile or enough of them. There is usually a delay in getting cleaners to get the space cleaned for them and us, we tend to just clean the bed ourselves - you are reliant on porters to bring the bed, nurses to have the bed ready with a mattress, there are all kinds of - trying to get the discharge summary is a problem, you would be crying at the end of it, it is a hugely involved form, the anaesthetist has to do a discharge and the ward kardex has to be done before they leave with all the drugs on it and then you have to go through that yourself to make sure nothing is off and tick the times the drugs were last given at and sign in what you have given. Then you are taking out lines, it is a very slow process and the patient may be very anxious..”

“There are never any beds, isolation rooms and staffing.”

“There are always delays around beds- bed availability and management- that’s what it comes down to. We are totally reliant on admissions giving us the beds, obviously their hands are tied a lot of the times-it’s trolley watch and patients listed to come in, they have more coming in than going out.”

“Yes timing, the time the bed is identified and the time the bed is available can be two very different things, that is improving because there is an appointed nurse that facilitates the discharges. There can be frustrations dealing with the admissions department, when I say admissions you probably think of bed manager, I might highlight we have 5 patients cleared for discharge in the morning their conditions may change and they find this very frustrating because they say to you but they were to go out this morning and you’ve cancelled them now, and now you have made a mess of everything. Things change, people are in hospital because they are sick, you can’t predict, things change so yes it can be challenging at times and frustrating for everybody involved and I suppose there is a huge demand at hospital level and I don’t have an appreciation for that, I see the unit that I work in - the poor people in the admissions department are getting it from everywhere.”

Appendix 47. Excerpts from Charge Nurses' interviews - Question 8

"From a legality end if there are mistakes made it is one person's word against the other but to be honest I have never had any personal experience with a breakdown like that. It tends to be quite good."

"Getting through to particular units is a problem particularly in smaller hospitals you may not have direct lines so you would be going through switch and you could be on the phone forever trying to get through. Then you might get through to the unit and then trying to get the person could be a problem – timely and wasting everybody's precious time, we have the speed dial to get from unit to unit which is helpful but that speed dial isn't available for every…it might get you through to the hospital but not through to the units so if we had unit to unit would be helpful. Interviewer: or to the manager? If there was a direct number to the manager

"If it is written it is there on paper and you have a paper trail, a telephone conversation is something that happens between two people and what is said and what is perceived sometimes can be two very different things. To date I have not had that experience but I can see how there could be miscommunication. In general it is both because you are dealing with people on the phone and you have written confirmation going with the patient, you have a detailed discharge letter, a detail of their stay with you and there would be a particular transfer letter, you are also sending the nurse who has been looking after the patient. You're dealing with the person in charge on the other side and you are going through the various needs of the patient, anything that you may have omitted to cover in telephone conversation is going to be covered on paper. I think both are really important."

"Obviously if I am giving the handover over the phone I am just telling something important to A person I am just telling A person nobody is hearing it and nobody is witnessing it and there is no record of it. That's a drawback really. If the phone is busy /engaged that's also a problem. When we have clear documentation we can go through everything and make sure that we passed on all the information, the receiving person can look over it again and again and if somebody else needs to know anything they can look over it, it is a big advantage actually."

"There would be a potential weakness that we don't have any proof that we have made these calls if we email the information we have the transmission verification. I don't have proof that I made a call only that I have to document that I have made the call in our communication book-

which takes time. Also there is no proof that I have given all the information-what I have said is not recorded, em so I suppose they are negatives. And it very much depends on the integrity of the person who is making the call and the person who is receiving the call, as to what information they say they have heard. It also very much depends on the person who is receiving the calls for communicating that information further on, that might be for instance an infection control issue, I might tell a nurse about an infection control issue-what she does with that information I don't know. If this was followed up by email or followed up by fax then I would have proof."

Appendix 48. Excerpts from Charge Nurses' Interviews - Question 16

"Like I say it depends on whoever is delivering the information. Once more as said previously there is no proof- it is not standard practice to put someone on speaker when you are making this phone call so I suppose the honesty of the person making the call..you have no proof exactly what has been delivered. Someone could tell me that they had told me that a patient was VRE positive but they may never have said it- who believes in that instance and their word against mine as such."

"Sometimes you don't get to talk to the person actually looking after the patient, it could be the secretary ringing from the hospital, so they are just saying the ambulance has left or they booked the ambulance and that the patient that you have accepted is on their way because the other nurse is too busy, or from A+E or it is during change of shift."

"I think you should have both. Not heard or how you relate something is very subjective, it could be very difficult it could be very busy in the referral centre you may be the nurse involved there is a lot going on you are trying to prioritise the information that you are giving but there may be some details that you omit - family dynamics things like that, so I think both are very important. Unfortunately they don't seem to come at the same time usually you are engaged in a verbal discussion first, the written paperwork is coming as the patient is coming."

"I am just telling to one person, if that person is stressed sometimes they can miss the spoken data which you or I can. Sometimes it can happen if you get a lot of information so I think if we have something written. This can cause problems especially for infection - if somebody comes and if somebody forgot to inform them about infection issues."

"..the only thing I can think of is the official reports, CT reports and things like that, they are much better and more reliable when you get the written confirmation report but the general overview is all verbal."

Appendix 49. Excerpts from Charge Nurses' Interviews - Question 23

"I suppose once more it is time consuming , it depends who you get on the ward and it depends on whether they will answer the phone- you could be left hanging on. It can take a number of phone calls. It's us to bed manager, it's bed manager back to us, and then it is us to the ward to tell them that the bed is being made available for us and sometimes it's multiple phone calls to ask are you ready? Are you ready? It is the only way short of having the information relayed at the bed management meeting. Once again it depends on the quality of the information that is delivered and how they utilize the information that is given. I don't have any control over what they do with the information."

"Trying to get the phone call answered on the ward, trying to talk with the right person- they could be in meetings, they could be on break."

"Same thing, if I say something to one person they are only hearing me, there is no evidence, there is no record."

"As long as you can control it that there is only one person ringing them or else they just feel harassed."

"I suppose one of the downsides of the phone call is that it may be difficult if you may have a change of shift, you might be dealing with one person who goes off at 4 o' clock and you're dealing with another person and they have got a whole new take on it and that's where your difficulty would be whereas if it was written if it's on-line it is there in black and white irrespective of who reads it, it's there the information is there. Depending on the timeframe you might find yourself repeating yourself all over again. I can't say that it has happened to me very often but it does happen. You are duplicating the work if you are going through the same handover again with a different person, whereas I guess if it was all there in black and white it's there. If you have handed over to the ward they should be able to handover to each other. What you say and how it is perceived the spoken word becomes an issue when you are under pressure to actually get the bed moving so you might get a response back to say look we are really busy too and people may get a little bit upset and it is nothing about them it is just that everybody is trying to do their best for their patient but you may just upset people. I suppose a

telephone conversation can get heated whereas written won't. You are just going to put down the facts on paper."

Appendix 50. Excerpts from Bed managers' Interviews – Question 3

"We need to get a handover from the nurse in ICU. We obviously get the patient's name, their diagnosis, what consultant they are under. We get a handover on what is wrong with the patient and their needs requirements, for example, If they need isolation. If they are confused they may need a special or if they are suicidal. If they are public or private. Sometimes if patients are private, they are not often suitable for a single private room, so you would have to discuss if they are very sick, they might need to be in a six or four bedded area on a semi-private ward rather than in a single room because they may be too far away from the nurse's station. Even though they are entitled to a private. They may move the patient from the ward in a few days time, when they are not as ill. Sometimes some of the rooms are too far away from the nurse's station and if they need constant observation they would need to be up by the nurse's station where they are safer. If the patient has a tracheoostomy it is important because they may have a lot of equipment, so even though they might not be for isolation they may need a single room if they are highly dependent and have a lot of equipment. If the patient needs a bariatric bed, some of the bariatric beds don't actually fit in some of the wards, so you need to get a single room for those patients even though they don't need isolation. As you get the full handover from the CNM or the staff nurse in ICU you come the conclusion as to what type of bed the patient requires at the end of it."

" Name, diagnosis, consultant, medical or surgical patient, are there Infection control issues. Discuss with infection control If we can cohert. Does the patient have a tracheostomy, on trilogy or BIPAP? - Because if so they can only go to the respiratory ward. Is the patient confused? Is the patient at risk of suicide? -If so a ground floor bed is needed."

"Our real remit is just knowing the information as to the patients that are currently here who can come out and their requirements. Whether they have any special requirements such as isolation or trachy care or if they need specials. Obviously those kind of things delay being able to find an appropriate bed. If they are requiring trachy care not all the wards would have the ability to mind them."