FLIGHT NURSE PERCEPTIONS OF FACTORS INFLUENCING CLINICAL DECISION MAKING IN THEIR PRACTICE ENVIRONMENT

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ABSTRACT

Flight nurse perceptions of factors influencing clinical decision making in their practice environment

This research project sought to describe the flight nurses’ perceptions about the factors that influence clinical decision making in their flight nursing practice, using a descriptive survey methodology. Data were collected with a specifically developed questionnaire to describe flight nurses’ perceptions of factors influencing clinical decision making. Data were analysed using descriptive statistical analysis for the quantitative data. Thematic analysis was applied to evaluate the unstructured descriptive data, from which themes emerged.

Themes readily emerged as factors which participants perceived influenced clinical decision making in their flight nursing role and in the aeromedical role. These themes included pre-flight preparation, patient status, experience and education of the nurse, and the challenges associated with the physical and atmospheric environments.

The majority of participants (73%) worked in more than one type of team configuration, for example, nurse only, nurse and doctor. Twenty one participants perceived there to be a difference in clinical decision making when working within different team configurations. Flight nurses identified a clear, perceived difference in clinical decision making based on the team configuration. Experience of other team members present was a contributing factor as to whether the flight nurse was the senior clinician or if the flight nurse was considered as the person with the specialist and technical knowledge of the aviation environment.

All participants highly rated the importance of completing a flight nursing course as a professional development activity which had an influence on their clinical decision making. A flight nursing course was considered the minimum requirement for practising in this environment. Few participants had completed a postgraduate physical assessment paper, yet many identified diagnostic
reasoning, advanced nursing diagnosis as some of the influences in their decision making.

The findings add to the paucity of knowledge of clinical decision making in this context of flight nursing practice.
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Chapter 1
INTRODUCTION

1.1 Introduction
Flight nursing practice is multi-dimensional, with a unique characteristic of a
dynamic environment in which this practice occurs (Holleran, 2003). Flight
nurses provide care to a range of patients with a myriad of illnesses and injuries
in diverse, dynamic and unfamiliar environments, such as, the aircraft,
unfamiliar hospitals, staff, ambulances, and in extremes of weather and terrain.
These dimensions of caring for sometimes critically ill and undiagnosed patients
combined with the constraints of the aviation environment challenge the flight
nurse beyond the conventional delivery of nursing care on the ground (Holleran,
2003). As Brookes (2001) describes, by the nature of this work environment,
the practice of flight nursing is largely invisible, unwitnessed, self-contained, in
isolation from many other health care professionals.

This thesis explored a non-experimental descriptive study of flight nurses
working within the central region of the North Island of New Zealand. The study
set out to identify the flight nurses perceptions of factors which influenced
clinical decision making in their practice environment. This chapter provides a
background to the study, the researcher’s interest in the study topic, the
significance of the study and the outline of the thesis.

1.2 Background
The history of aeromedical evacuations dates back to the first known air
medical transport in 1870, during the Franco-Prussian War, when a hot air
balloon was used to evacuate the wounded over enemy lines. Air transport of
causalities was utilised in World War II, with the Korean and Vietnam conflicts
further demonstrating the effectiveness of this method of transport for sick and
wounded causalities (Association of Air Medical Services, 2004). The civilian
healthcare environment adopted the use of air transport as early as 1918, when
in Australia, aircraft were utilised to fly doctors into remote sites and airlift
patients back to urban hospitals for more specialised care. This service later
became known as the Royal Flying Doctor Service, now flying in excess of 34000 missions annually (Royal Flying Doctor Service of Australia, n.d.).

In New Zealand hospital based programmes, both fixed and rotary wing, have developed over the past 30 years, bringing sophisticated advanced life support equipment and trained personnel encompassing medical, surgical, trauma, adult, paediatric, neonatal and maternal care to those patients in need (Day, 2007). The first helicopter rescue in New Zealand occurred in 1975 when an injured caver was airlifted from the Nelson region and transferred to hospital for further medical attention (Day, 2007).

The origin of flight nursing can be traced back to 1933 when the Emergency Flight Corps were formed in the United States of America (USA) by Laureate Schimmoler, although the establishment of the first flight nurse course did not occur until 1942 (Holleran, 2003). Flight nurses have since been activated into military service for conflicts such as the Korean and Vietnam Wars (Holleran, 2003) and in more recent times with conflicts around the world. The role of flight nursing is a relatively new nursing speciality within New Zealand with the development of a national organisation in 1996 as a special interest section of the New Zealand Nurses Organisation (Houliston, 2002). The New Zealand Flight Nurses Association began in the May when an Auckland Intensive Care Nurse/Flight Nurse recognised a need for standardisation, education and training of flight nurse practices within the New Zealand aeromedical environment (Houliston, 2002). Since then, the New Zealand Flight Nurses Association has developed an introductory flight nurse’s course, attended by more than 300 nurses (B. Nylund, personal communication, August 15, 2007).

The aviation environment incorporates the aircraft, the hangar environment, airports, and the physiological effects of altitude. The constraints of this aviation environment may include a restrictive cabin in terms of size, the presence of noise, vibration, turbulence, temperature variability, and at times, limited communication with medical personnel. Isolation from or a delay in medical assistance are potential constraints of the aviation environment. Patient conditions and situations may require interventions that extend typical nursing
practice and at times flight nurses may be required to make decisions and implement management in the absence of a medical officer. Although predetermined medical orders and clinical guidelines may exist, these may not always relate to the individuality of an unanticipated or emergency situation. Flight nurses must therefore be proactive in clinical decision making and intervene appropriately to manage the situation.

1.3 The Researcher’s Interest
My interest in flight nursing has grown from the past fifteen years working as a registered nurse in intensive care units. I had worked for nearly four years in intensive care prior to undertaking my first helicopter retrieval from a rural hospital of a patient who had sustained a community cardiac arrest. From this experience a desire to learn more about this area of nursing clinical practice began and became more involved with further transports through the intensive care unit.

The following year whilst attending a national intensive care conference, I was introduced to a flight nurse, who quickly became a friend and mentor who willingly shared her passion of flight nursing with me. Through this contact, I became active in the national association for flight nurses and became proactive in the local hospital transport service. During the past ten years, I have further developed the transport service for the hospital in which I worked, particularly in my role of Trauma Coordinator for a pilot Trauma Study sponsored by the Accident Compensation Corporation. From this I was appointed specifically to the role of flight nurse and later became nurse manager for the transport service and achieved over 1000 hours of flying as a flight nurse. I was also very active in the development and coordination of a nationally recognised flight nurses course with the New Zealand Flight Nurses Association.

During my role as Nurse Manager for the transport service, I made clinical decisions on a daily basis. Many of these decisions needed to be made, sometimes with limited information, in a short period of time in order to transport a patient in a safe and efficient manner. On many occasions, the rationale and
evidence for decisions I made, needed to be explained in particular to other less experienced flight nurses, and other nursing and medical staff who were less familiar with the unique nature of the aviation environment. At times, this was difficult to explain because as an experienced flight nurse I utilised my ‘gut feeling’ as a basis for some of my decisions. This has drawn me to consider some of the influences in my decision making and if other flight nurses have similar experiences.

1.4 The Significance of this Study
In the New Zealand literature there is anecdotal evidence but limited research about flight nursing practice, this matches the findings in the international literature (Kirschke, 1987; Malone, 1992). Little has been researched or written about the characteristics, experiences, significance and outcomes of flight nursing internationally (Bader, Terhorst, Heilman, & DePalma, 1995).

The healthcare landscape in New Zealand has undergone constant review, change and reforms in the past thirty years. The need to transport patients has grown since government policy introduced a move towards centralisation of health services to major city centres and the reduction of health services in the regional and rural areas of New Zealand (Ministry of Health, 1998). Travel time from place of residence to access secondary or tertiary services became a requirement in 1995 (Ministry of Health, 1994/95). At this time 97% of the population lived within the golden hour; that is one hour’s drive from a base hospital (Ministry of Health). This hour was considered the most crucial in fostering recovery from major trauma, and the distance was based on road travel, rather than air ambulance services. A base hospital was defined by the Ministry of Health (1994/95) as:

…one which provided a district trauma service or equivalent…. These hospitals are capable of the initial management, resuscitation and stabilisation of injured patients. They have a level I or II intensive care unit. Where patients need prolonged ventilation or tertiary surgical management, they would be transferred to an advanced trauma service. There are five hospitals with advanced trauma services (Auckland, Waikato, Wellington, Christchurch and Dunedin) (p. 84).
However, as specialisation of services has increased, travel times to reach these services have also increased. This change has resulted in the need for emergency inter-hospital transfers and subsequently, there now exists numerous flight services within New Zealand to provide this transfer service, transporting greater than 6000 patients in the previous year (Waters, 2007).

The New Zealand Flight Nurses Association (NZFNA) Standards of Practice state “flight nurses will work within their breadth of practice based on current nursing education, management and research knowledge, judgment, experience and competence” (2007, p. 5). Although the New Zealand Flight Nurses Association do not link this statement to any specific definition of clinical decision making, this does describe many of the actions and influences encompassing clinical decision making discussed in the literature (Grossman, Campbell, & Riley, 1996; Pirret, 2007). No research exists within the New Zealand context on clinical decision making in flight nursing.

The significance of this research study is the potential to identify the perceptions of flight nurses in relationship to the influences on clinical decision making and the impact on clinical practice these have. There is potential to increase the knowledge of and demystify what the actual clinical practice of flight nurses is. This knowledge and understanding may be utilised for the advancement of ongoing education and professional development of flight nurses to ensure a continuing high level of care is given to those patients who are requiring transport to other health care facilities. With such large volumes of patients being transport each year between hospitals, flight nurses have significant involvement with provision of health care to consumers and employers within this industry.

1.5 Aims of the Research
With limited research in New Zealand on flight nursing practice, the aim of this research study is two-fold.

1. To determine flight nurses perceptions relating to clinical decision making in flight nurse practice.
2. To explore and describe the dimensions of flight nursing practice within the New Zealand context.

1.6 Definition of terms
Throughout the thesis, terms such as ‘transport’, ‘transfer’, ‘mission’ and ‘retrieval’ are used to refer to patient transport by the participants and are used interchangeably. The term ‘aircraft’ is utilised to denote either a fixed-wing aircraft or helicopter.

1.6.1 Aviation environment
This incorporates the actual aircraft, including the cabin, the environmental conditions relevant to the mission and the working environment of the flight nurse, for example, the aircraft hangar and airports (Holleran, 2003).

1.6.2 Aeromedical environment
The environment in which flight nurses operate in, where it is influenced by the physiological phenomena of altitude, confined space and the extremes of weather and terrain (Air and Surface Transport Nurses Association, 2006).

1.6.3 Clinical decision making
Clinical decision making, in this research, was defined as the process by which a clinician identifies, prioritises, establishes plans, and evaluates data, leading to the formation of a judgment (Grossman, Campbell, & Riley, 1996).

1.7 Thesis Outline
1.7.1 Chapter One: Introduction
The introductory chapter has provided a background to the study. The significance of this study for nursing is explored; the research aims, research question and key definitions for the study have been described.

1.7.2 Chapter Two: Literature Review
A comprehensive review of the national and international literature of flight nursing and clinical decision making has been undertaken and is described in
this chapter. The literature has been drawn from relevant texts, journals and databases.

1.7.3 Chapter Three: Methodology
Within this chapter the chosen design for this study is described and the rationale for the selection of this design discussed. The sample, sampling method, participant recruitment and cultural considerations are described. Ethical approval is detailed and data collection and data analysis methods are discussed.

1.7.4 Chapter Four: Findings
This chapter presents the research findings in two categories; demographics, and clinical decision making.

1.7.5 Chapter Five: Discussion
Chapter five analyses and discusses the overall research findings in relation to the research question and aims incorporating relevant national and international literature.

1.7.6 Chapter Six: Conclusion and Recommendations
The research question will be revisited and summary of findings will be presented. Limitations of this study and recommendations for further research will be discussed.
Chapter 2
LITERATURE REVIEW

2.1 Introduction
A literature review provides a critical analysis and summary of research on the particular topic of interest (Polit & Beck, 2004), linking the proposed study to the context of previous research. The focus of this chapter is to discuss and critique national and international literature on flight nursing and clinical decision making.

2.2 Search Strategy
The literature for this review has come from multiple sources. An extensive search of the literature has been made of major nursing and allied health electronic health databases including the Cumulative Index for Nursing and Allied Health Literature (CINAHL), A – Z journals, PubMed and Proquest. Additionally, literature has been sourced from published texts, journals, on-line nursing and allied health journals. No date limitation was set, in order to gain access to a broad range of articles as possible.

A search was conducted with a variety of terms such as flight nursing, aeromedicine, aeromedical, clinical decision making, critical thinking, clinical judg(e)ment, diagnostic reasoning and clinical inference. These terms were linked to concepts and theories of decision making. These ranges of key words were used to ensure no pertinent material was excluded.

The literature review will discuss literature relevant to flight nurses, then in relation to clinical decision making.

2.3 Flight Nursing
Whilst flight nursing began in 1942, it has further developed from the speciality of critical care nursing (Holleran, 2003). Critical care nursing became a speciality over 30 years ago when nursing recognised the importance in the monitoring and observation of critically ill patients due in part to the development of new medical interventions and technology (Urden, Stacy, &
Lough, 2002). Critical care nurses are required to deliver skilled, high quality care to this particular patient population. Emphasis is placed on the requirement of the critical care nurse to have advanced technical skills, professional competence and responsiveness in order to manage critical patient emergencies whilst incorporating psychosocial and other holistic approaches as appropriate for that patient (Urden, Stacy, & Lough, 2002).

From this development of critical care nursing, the role of the flight nurse can be viewed in two ways. Firstly, as an extension of hospital critical care nursing practice and secondly as unique in terms of caring for patients in diverse, dynamic and hostile environments, such as different aircraft types, pre-hospital environments and situations, unfamiliar hospitals and ambulances; all in extremes of weather and terrain (Holleran, 2003). Patient care is managed with the finite resources available in the aircraft, and frequently in isolation from other clinical personnel (Houliston, 2002).

Considerable flight nursing literature exists predominantly in the North American context ranging from anecdotal or case study reviews (Kirschke, 1987; Malone, 1992), education orientated material (Holleran, 2004; Smith & Goldwasser, 2003; Weber, Mare, & Battaglia, 1994), reviews of practice domains (Jones & Young, 2004; Latendresse, 2004) and historical accounts (Ford, 2004; Lee, 1987; Sheehy, 1995). There is, however, a paucity of research literature relating to flight nurse practice within New Zealand, with only one research study found on this clinical area (Brookes, 2001). Over the last ten years, only seven articles and/or exemplars of flight nurse practice in New Zealand, either professional or technical, have been published. These have been through the New Zealand Flight Nurses Association newsletter (Blair, 2001; Hiko, 2002; Hitchcock, 2001; Hutchison, 2001; Murray, 2000; Pantano, 2001, 2002). Two articles relating to flight nurse practice were found to have been published in other New Zealand publications (Houliston, 2002; Jones, 2003).

Brookes (2001) utilised a storytelling methodology to describe flight nurse practice, through stories, within an intensive care unit in a New Zealand context. Four ‘storytellers’ participated and were interviewed in this research. From the
participant interviews, four common themes were identified, planning, communication, teamwork and the unexpected. Using these stories, Brooke’s presented a model for advanced and specialty flight nurse practice, to improve the transport experience for the patient and or family and to improve the process of patient care in transport in general. A limitation of this study was that the research focused on only one New Zealand hospital, with only four participants, but it was considered by Brookes these stories would be familiar with other flight nurses in New Zealand. Brookes research supports the requirement for advanced skills and training as discussed by Bader, Terhorst, Heilman and DePalma (1995) who conducted a retrospective study of 150 flight programmes within the United States of America (USA). Bader et al. (1995) also identified potential for the development of advanced practice roles within flight nurse practice.

In an Australian phenomenological study by Pugh (2002), flight nurses from the Royal Flying Doctor Service were interviewed to determine the lived experience and the meaning of clinical decision making by flight nurses in emergencies. The findings revealed several themes of knowing the patient, which included intuitive, experiential and objective knowing. Participants provided narratives and exemplars that demonstrated varied intuition, interpretation and use; however, they expressed difficulty in stating exactly what intuition is. This finding supports the work of Benner (1984) on expert nurses. The theme of context of knowing as described by Pugh (2002), articulates the scope in relation to emergencies, which includes the aviation environment, no or minimal involvement in triage, knowing colleagues, being the sole practitioner, experiential level and practice guidelines. All these factors influence the clinical decision making process of the flight nurses within this context, especially the physical structure, physiological stressors and associated constraints that makes flight nursing significantly different from nursing within the stability and security of a hospital. The final theme was of reflective practice, which included self-critique and change in practice. The influence of self-critique would enable flight nurses to change their practice. The study was confined only to the flight nursing practice area of Western Australia and does not necessarily represent experiences of other flight nurses or other flight nursing practice domains.
An identifying feature of flight nursing practice, which makes it different from critical care nursing practice within a hospital setting is the physiological stresses related to altitude, which both the patient and transport staff are subjected to during the air transport process (Holleran, 2003). Altitude physiology is concerned with concepts of gas laws and variability of temperature, pressure, volume and mass of gases and the subsequent effect of these on the body. Understanding concepts of altitude physiology is crucial as this forms the basis for the skills utilised by the transport staff when transporting patients by fixed-wing aircraft or helicopter (Holleran, 2003). Clinical decision making in the context of flight nursing, now takes on a new dimension when combined with the demands of caring for sometimes critically ill and undiagnosed patients, with the constraints of the aviation environment challenging the flight nurse.

2.4 Clinical Decision-Making
Hamers, Abu-Saad, and Halfens (1994) contend that there is no unequivocal definition of decision making with varying terms used to denote clinical decision making such as clinical judgement, clinical inference, diagnostic reasoning and medical problem solving. The use of varying explanations, definitions, and numerous interpretations of the components and process frameworks for clinical decision making within the literature challenges the attempts to define the concept of clinical decision making (Buckingham & Adams, 2000a).

In this research clinical decision making is defined as a process which the clinician identifies, prioritises, establishes plans, and evaluates data, leading to the formation of a judgment to provide patient care (Grossman, Campbell, & Riley, 1996). As part of clinical practice, nurses make clinical decisions daily, which effect patient health care outcomes and the actions of other healthcare professionals. In dealing with increasing patient complexity and technological advancement combined with often declining resources, nurses must rely on sound decision-making skills to maintain up to date care and positive patient outcomes. Buckingham and Adams (2000a) argue the importance for nurses to have a better understanding of their decision making processes so that patient care, organisational effectiveness and quality management are improved. This
is of particular importance when working as a flight nurse with diverse patient populations in combination with the aviation environment.

Jenks (1993) regards clinical decision making as a highly complex process that encompasses cognitive, intuitive and experiential processes. Cognitive studies into clinical decision making have demonstrated that it is a complex and highly variable process. The cognitive approach to decision making by nurses varies according to the complexity and variability of the scenario (Corcoran, 1986a, 1986b).

Much of the research conducted during the 1980s and 1990s has provided the theoretical perspectives to decision making, which lays the foundation for the discussion on clinical decision making. Two theoretical perspectives discussed in the research of clinical decision making are the rationalist and the intuitive (or phenomenological) perspective (Thompson & Dowding, 2002). More currently, research has seen the emergence of a third perspective to decision making referred to as the middle ground (Thompson, 1999).

2.4.1 The Rationalist Perspective

Researchers who adopt a rationalist perspective believe that a clinical situation should be analysed, subsequent actions should be rational, logical and the nurse should be able to articulate their knowledge and judgement process (Harbison, 1991). Two models which align with the beliefs of the rationalist perspective are a statistical model and a cognitive model. The rationalist perspective presumes that decisions are arrived at using a logical sequence of cognitive processes. Studies which have researched cognitive processes (Hamers, Abu-Saad, & Halfens, 1994; Thompson, 1999; Thompson & Dowding, 2002) have been situated within the information-processing model, which is also known as the hypothetico-deductive approach. Within the information-processing model, two sub themes; the prescriptive and descriptive approach, are identified (Cioffi & Markham, 1997; Thompson & Dowding, 2002). A prescriptive approach focuses on how decisions ought to be made and a descriptive approach focuses on how decisions are actually made. However, it
is important to note that the nature of the event, the process employed and the individuality of the nurse will influence the outcome.

A key assumption of the information-processing model is that the decision maker stores relevant information in their memory. Effective decision-making or problem solving occurs, when information is retrieved from short-term and long-term memory (Muir, 2004). Researchers have proposed different stages of reasoning (Carnevali & Thomas, 1993; Muir, 2004) with four common features of this process identified; cue acquisition, hypothesis generation, cue interpretation and hypothesis evaluation. Using this method of decision making, the clinician selects cues from the presenting situation and uses these to build up a hypothesis of a possible diagnosis. Further cues to confirm or refute these hypotheses are sought, and comparisons are then made between their significance, which leads to a conclusion that confirms the hypothesis as a diagnosis (Hamers, Abu-Saad, & Halfens, 1994; Harbison, 1991).

The information processing model or hypothetico-deductive reasoning has been seen as a medically orientation, rational, empirical and therefore a ‘masculine’ form of decision-making rather than the intuitive, feelings base, ‘feminine’ form, which has been traditionally ascribed to nursing (Evans, 2005). However, Harbison (1991) suggests that the information-processing model is a more dynamic model and one that is appropriate for emergency care, where relevant information needs to be established quickly and encourages intervention and treatment during the assessment phase.

Bucknall and Thomas (1995) in a self-reported questionnaire study of 230 critical care nurses in Australia, examined the frequency of decisions made and the relationship between the nurses’ levels of appointments and the frequency of decision making. The questionnaire described a range of situations in critical care nursing in which the participants had to make either diagnostic, therapeutic or procedural decisions. There was substantial variation in the patterns and frequency of nurses’ decision making, with a higher level of appointment shown to increase participation in decision making. A study by Hoffman, Duffield and Donoghue (2004), supported the finding of frequency of decision making being
associated with level of appointment but believed it could also be a barrier to decision making in hierarchical organisations, where the decision making is with more senior staff, not with the nurses at the bedside. An unanticipated finding of the study by Bucknall and Thomas (1995) was that some decisions made reflected the hypothetico-deductive model of rational decision making.

The information-processing model is not without some weaknesses. It is possible to focus too much on either one particular hypothesis, or, of finding a diagnosis or missing potential outcomes. There is also a risk towards ‘confirmation bias’ where there is a tendency to prove ideas rather than to disprove them (Buckingham & Adams, 2000b). Additionally, the amount of information that the problem solver can attend to at any one time can affect cue recognition, which may be related to the level of clinical knowledge and experience (Taylor, 2000). Another weakness of the hypothetico-deductive model is that it has a linear sequence, which is not evident in clinical practice because stages are frequently overlapped and change their order (Thompson, 1999). The information-processing model by Carroll and Johnson (as cited in Muir, 2004) suggest that the stages of decision making do not follow in a linear pattern and can be repeated or returned to as necessary.

Westfall, Tanner, Putzier and Padrick (1986) conducted an exploratory study which examined nursing inferences within a framework of information processing theory. The sample consisted of 28 nursing students and 15 practising nurses from a university hospital within the USA. Participants were provided with simulated clinical scenarios that required diagnostic reasoning. Diagnostic reasoning describes the clinical process as in the information-processing model for gathering of cues, formulating a diagnostic hypothesis, gathering data in relation to the hypothesis and then evaluating the data to arrive at a diagnosis (Jarvis, 2004). Findings on one component of the diagnostic reasoning process indicated the activation of hypothesis is a component of the diagnostic reasoning process and were used by both groups of participants. The level of preparation did not influence the number of hypotheses activated, nor did the comprehensiveness, efficiency, proficiency or
timing of activation; however the level of preparation paralleled the complexity of hypothesis activation.

Harbison (1991) considered the most appropriate representation of the rationalist perspective is that of decision analysis. Decision analysis is an applied approach of the statistical decision theory and is considered a rational, logical approach to choosing between mutually exclusive options and focuses on the decisions that need to be made, rather than the process (Carnevali & Thomas, 1993). In decision analysis, a model of a problem is constructed, indicating the options available to consider and the consequences of each of those options (Harbison, 1991). A statistical probability is allocated to each option and then each option is assigned a value to reflect the desirability of the outcome. This value should represent the patient's expressed value, where possible. If this is not possible, the nurse will assign the value. The probability and the value are combined and the expected value of each option is then presented. The option with the highest expected value is the best option (Harbison, 1991).

To elaborate further, the decision analysis model is often represented by a pictorial device called a ‘decision tree’ (Harbison, 1991; Jones, 1988), with each branching point representing the point in the diagnosis sequence where a decision has to be made. This method of analysis often relies on the use of Bayes theorem, which “enables the decision maker to assess correctly probabilities of events, based on the logical interpretation of evidence” (Harbison, 1991, p. 129). The utilisation of a ‘decision tree’ may prove a useful tool for a novice practitioner to structure the progression of choices and consequences, for example, selecting the appropriate dressing product for a particular wound.

A study by Baumann and Deber (1989), studied rapid decision making within the intensive care nursing environment, in the context of decision analysis. Utilising case vignettes, which combined questionnaires and interviews, thirty nurses from two intensive care units, identified considerable variation in choice of action and every nurse in the sample selected a different sequence to
performing the events. Results from this study indicated that the use of decision analysis in the intensive care nursing situations to be excluded, as unexpected events may make the problem difficult to define.

Researchers (Carnevali & Thomas, 1993; Corcoran, 1986b) note that decision analysis is a promising method when applied to complex, deliberative decisions, for example, pressure area management and wound care planning. However, the same researchers (Carnevali & Thomas, 1993; Corcoran, 1986c) further described limitations in the application of the decision analysis method, especially when rapid or crisis decision-making is required and resulting actions are needed quickly, as in the flight nursing role.

A study by Panniers and Walker (1994), comparatively analysed a complex patient problem using a decision analysis approach and intuitive processes. A convenience sample method was utilised to identify 31 nurses employed in a community hospital in the USA. The research method utilised a hypothetical clinical case description, using questionnaires and the Delphi method. Eleven nurses (35%) from the sample were able to demonstrate that their choices, given the presented clinical problem were the same using the decision analysis approach and their intuitive decisions. Results indicated a significant disagreement between the two approaches when the relative ranking of the vector of five treatment choices obtained intuitively, was compared with the relative ranking when the decision analysis model was used. This study refuted the findings by Baumann and Deber (1989) however; the decision making studies were on contrasting nursing actions, which required a decision.

A number of studies have focused on strategies for clinical decision making in nursing (Corcoran, 1986a, 1986b; Panniers & Walker, 1994; Tanner, Padrick, Westfall, & Putzier, 1987). Factors influencing the decision making process include knowledge, experience, contextual setting, experiential level, personal variability, frequency and the diagnostic tasks (Benner, 1982; Benner & Tanner, 1987; Bucknall & Thomas, 1995; Corcoran, 1986b).
A number of researchers contend that nursing is not amenable to the rationalist perspective because of the intuitive and qualitative nature of nursing (Benner, 1984; Walters, 1994). Nurses have expressed difficulties when asked to quantify their qualitative judgements (Baumann & Deber, 1989). The identified limitations of the rationalist perspective are augmented by the relevance of an intuitive perspective of clinical decision making in nursing.

2.4.2 The Intuitive (Phenomenological) Perspective

Researchers who ascribe to the intuitive (or phenomenological) perspective contend that action precedes rational analytical thought and there are limits to the use of formal strategies of judgement. The practitioner at the expert level is able to identify and use patterns within the whole situation, rather than identifying discrete elements within the situation (Harbison, 1991). Experiential and intuitive patterns of knowing have been identified and described in a number of studies relating to clinical decision-making and the practice of nurses (Bakalis & Watson, 2005; Benner, 1984; Benner & Tanner, 1987; Benner, Tanner, & Chesla, 1996; Pugh, 2002).

Patricia Benner is attributed with developing the intuitive model and describing the importance of experiential knowledge (1984). Benner and Tanner (1987) describe intuition as “understanding without rationale” (p. 23) and this is often referred to by nurses as a gut feeling, insight, instinct or hunch. Benner’s work (1984) argued that intuition is an essential part of clinical judgement and links to the nurse’s expertise (1984). She found that the judgements of expert nurses were different from those of nurses with less expertise. Novice nurses practice within a framework of rules and guidelines and considers all or most of the issues in a clinical scenario, as evident in analytical decision making to understand the current situation and to guide their actions. By contrast, the expert nurse no longer relies on an analytical principle for decision-making and can view the clinical situation as a whole to identify the nature of the clinical problem.

In a study by Smith (1988) the themes of intuition and pattern recognition were demonstrated. Thirteen themes emerged from qualitative data analysis
provided by six experienced critical care nurses from two 300 bed hospitals in the USA. The thirteen themes were an initial period of stability, subjective certainty, non-specific felt changes, reliance on gut feelings, search for confirming evidence, gradual pattern recognition, difficulty communicating with the physician, intervening factors, importance of context, the preventative role of the nurse, a sense of involvement with the spiritual realm and ethical decision-making. Gradual pattern recognition is described as a process of closely searching for signs and symptoms. Significantly, the nurses identified patterns in their patients' behaviour through prior knowledge of deterioration in these types of patients. Intuition is described in this study as non-specific felt changes and participants related to the need to rely on gut feeling. Respondents used the term premonition, identifying that something was going to happen to the patient “I had a feeling this guy was very sick” (Smith, 1988, p. 13). Though these nurses could not always articulate the specifics of the clinical scenario, it did not detract from the significance or the accuracy of their assessment of the situation.

Benner’s and Tanner’s work on intuition (1982, 1984, 1987) are based on the research on the Dreyfus Model of Skill Acquisition (Benner & Tanner, 1987). Their qualitative research further supports the key aspects of intuition identified in the Dreyfus Model. These six key aspects of intuition are pattern recognition, similarity recognition, common sense understanding, skilled know-how, a sense of salience and deliberative rationality. Pattern recognition was identified as a perceptual ability of the nurse to recognise configurations and relationships without identifying specific components of the situation. Expert nurses were able to identify patterns of patient responses (Benner & Tanner, 1987). Similarity recognition refers to recognising resemblances or where the nurse experiences the patient as being dissimilar to past patients. Recognising similarities and dissimilarities allows the nurse to investigate the patient’s clinical situation and emerging patterns of behaviour. Recent studies confirm the use of intuition, experience and pattern recognition in clinical decision making in the emergency and critical care environments (Cioffi, 2000; Tippins, 2005).
In a descriptive, naturalistic study, Jenks (1993) examined the realm of patterns of personal knowing in the decision-making process by nurses in surgical, medical, paediatric and rehabilitative areas. Twenty-three nurses with at least one year of experience in nursing practice, from a 700 bed university hospital in the USA were interviewed. The descriptive methodology utilised allowed for the emergence of data from the experiences of the nurse participants. Knowing the patient emerged as a prevalent theme. Nurses described that knowing the patient made the decision making process easier and in situations where they did not know the patient, then the decision making was undertaken with a degree of trepidation. The findings of the themes of knowing the patient, detecting the patient was different in some way or the reliance by the nurses on their gut feeling is supported by many other studies (Cioffi & Markham, 1997; Crandall & Getchell-Reiter, 1993; Peden-McAlpine & Clark, 2002).

Baumann and Bourbonnais (1982) studied nurses decision making associated with cardiac patients, examining the nature of rapid decision making in a crisis. The sample group consisted of 50 nurses from critical care units in three urban hospitals in the USA. Semi-structured interviews were conducted and data was analysed and coded using an inductive approach. Their findings suggested that knowledge and experience are the most important factors that influence rapid decision making and although the nurses made appropriate decisions, they were not able to provide a theoretical rationale for their chosen decisions.

Watson (1994) in an exploratory study of decision making of nurses in clinical areas suggested that experienced nurses verbalised their use of experience less than inexperienced nurses did. Two possible reasons identified by Watson for this were, that the experienced nurses use their experience less, or their experience had become internalised so much, that they used it without being able to identify it as experience. The inability of expert nurses to verbalise their rationale is consistent with Benner’s (1984) work on expert nurses.

An exploratory study by Bakalis and Watson (2005) aimed to identify and compare nurses’ clinical decision making in three different nursing specialties; medical, surgical and critical nursing, using a questionnaire. A convenience
sample of 60 nurses, 20 nurses from each clinical area from a hospital within the United Kingdom (UK) was used. They found that nurses made regular clinical decisions in relation to direct patient care but the critical care nurses used their extended roles to diagnose a patient’s condition and acted in emergencies more often than nurses working in medical or surgical areas. The length of experience significantly correlated with the decision making in each clinical area and the more experience the nurses had, the more frequently they made clinical decisions. This finding supported the work of Benner and Tanner (1987).

The use of intuition for decision making has not been without its difficulties in the past. Intuition has lacked some legitimacy in the eyes of other health professionals because of the difficulty in articulating, legitimising or rationalising intuition (Benner & Tanner, 1987; Evans, 2005; Thompson, 1999) which is necessary in the development of nursing as a profession. It is argued that intuition is a function of experience and involves the nurse processing information (Buckingham & Adams, 2000b; Cioffi & Markham, 1997; Thompson, 1999) as seen in the information-processing model. This debate has seen the emergence of the middle ground perspective

2.4.3 The Middle Ground Perspective

There are researchers who currently argue that there is a place for an alternative theory or explanation, which acknowledges the differences between the information processing model and intuition (Buckingham & Adams, 2000b; Harbison, 2001; Thompson, 1999; Thompson & Dowding, 2002). Researchers suggest that reasoning is neither purely analytical nor intuitive, rather is located at some point in-between.

The cognitive continuum adapted from Hamm (1988) is presented as an alternative for decision making and that it acknowledges the differences between analysis and intuition. In the cognitive approach, the major determining factor of whether the rationalist or intuitive approach to decision making is used is by the position of the decision task on a continuum. The most appropriate cognitive mode to use for the selected task depends on the
structure of the task, the number of information cues and the time available to make the decision (Thompson & Dowding, 2002). There are six modes within the continuum. Modes one to three are represented by the scientific experiment to quasi-experimental modes where nursing has established a body of research and is generating specific nursing inquiry. Modes five and six represent the intuitive and peer-aided judgment where evidence and practice is articulated (Harbison, 2001; Muir, 2004). Thompson (1999) argues the usefulness of the fourth mode, of system-aided judgment, that may occur if a nurse utilises a decision framework of statistical probabilities and outcomes. Harbison (2001) however, argues that the utilisation of this mode of decision making is unlikely as this mode of practice is neglected in nursing.

A retrospective study by Offredy (1998) explored decision making of nurse practitioners during patient consultations. A snowball convenience sample used 20 nurse practitioners in the UK and semi-structured interviews were conducted. Offredy found the cognitive processes used in this group did not fit into any one decision making approach, rather a variety of approaches were applied to the given information according to the presenting problem. This supports the use of the cognitive continuum as an alternative to decision making.

Lauri et al., (2001) conducted a study across five countries to identify the cognitive processes nurses used in their decision making. The questionnaire used in this study was based on the analytical and intuitive decision-making processes and Hammond’s cognitive continuum theory. This was a large sample of 459 registered nurses, working in either geriatric or acute medical-surgical wards, from five participating countries. The results indicated that intuitive decision making was associated with increased levels of professional education and practical experience and those with a lower level of education and experience used the analytical decision making perspective. These results support Hammond’s cognitive continuum theory. The utilisation of both analytical and intuitive perspectives of decision making as described by Lauri et al. (2001) were confirmed by Hedberg and Larsson (2003).
More recently, Bucknall (2003) examined the environmental influences on the decision making activities of 18 critical care nurses in three hospitals in Australia. A naturalistic design of observation was conducted followed by semi-structured interviews. Three main categories of environmental influence on decision making were identified; patient situation, resource availability and interpersonal relationships. The significance of the context on the type of decision, the frequency and order of the decisions made was demonstrated, however Bucknall asserts these influences on patient outcomes require further examination.

2.5 Summary
The literature suggests that clinical decision making is a blend of quantitative and qualitative components. Utilisation of analytical models of decision making, are more likely to be used by the novice nurse, who may possess a limited clinical framework on which to base judgement and decisions. Clinical decision making by experienced nurses appears to be more than a linear, isolated practice, but rather a dynamic, multi-factorial phenomenon, utilising different frameworks for each situation encountered.

The practice of flight nursing, however, is poorly described in terms of content and process, particularly in the New Zealand context. The limited literature on flight nurse practice, which describes practice in isolation and the potential for unexpected events (clinical or aviation), supports the rationale to examine the factors, which flight nurses perceive influence their clinical decision making in their practice environment.

Chapter three discusses the methodology utilised in the development of this research.
Chapter 3

METHODOLOGY

3.1 Introduction
The literature review has identified that although considerable literature exists regarding clinical decision making, there is little research or knowledge of information relating to flight nurse practice in the New Zealand context in order to answer the research question. This chapter explores the research design and rationale for the selected methodology. Sample criteria and selection, ethical and cultural considerations, data collection and analysis are detailed.

3.2 Research Design
Nursing research is described as a “systematic inquiry designed to develop knowledge about issues of importance to the nursing profession” (Polit & Beck, 2004, p. 3). Nurses are required to provide high quality care and improve patient outcome; by nursing practice, guided by the knowledge generated through nursing research (Nursing Council of New Zealand, 2005).

As demonstrated in the literature review, studies on clinical decision making have utilised many varied research designs and methods. The literature review has revealed extensive literature regarding decision making exists, but little research or knowledge of information relates this to flight nursing practice. The lack of previous experimental research in the area of flight nursing requires the need to conduct non-experimental research first to document the scope of a problem and to describe relationships and variables that may exist (Polit & Beck, 2004). From the literature review, it was considered a quantitative methodology as an appropriate method to seek answers to the research question of this thesis (Nieswiadomy, 1998; Polit & Beck, 2004). Polit and Beck (2004) agree that a vast number of human characteristics, for example personality or beliefs, are not able to be manipulated and could not be studied in an experimental manner.

Within non-experimental design, there are two broad categories of research; ex-post facto (or correlational research) and descriptive research (Polit & Beck,
Ex-post facto research occurs after variations in the independent variables have taken place. The second broad category of non-experimental research is descriptive research. The main objective of descriptive research is to observe, describe and document aspects of a situation or group as it naturally occurs (Polit & Beck, 2004). A non-experimental survey study is where self-reported data is collected from samples with the purpose to describe some variable of interest within that population (Nieswiadomy, 1998). Surveys are generally utilised when asking respondents about their attitudes, opinions, perceptions or behaviours. As I was seeking to describe the factors which flight nurses perceive influence clinical decision making, a non-experimental, descriptive design was chosen as the appropriate methodology to answer the research question in this study.

In summary, the research design for this thesis was a quantitative, non-experimental, descriptive survey study utilising a questionnaire as the data collection tool.

3.3 Research Question
What perceptions do flight nurses have about the factors that influence clinical decision making in their practice environment?

3.4 Research Aims
The aim of the research is two-fold:
1. To determine flight nurses perceptions relating to clinical decision making in flight nurse practice.
2. To explore and describe the dimensions of flight nursing practice within the New Zealand context.

3.5 Setting
The setting for this research encompassed Registered Nurses, who were members of the New Zealand Flight Nurses Association (NZFNA), within the geographical boundaries of the Central Regional Ethics Committee of New Zealand. A letter was sent to the secretary of the NZFNA requesting utilisation of the membership database for the purposes of this research. Consent was
given by the National Committee of NZFNA (Appendix I). After satisfying all of the Central Regional Ethics Committee’s requirements (Appendix II), the questionnaires were couriered to the NZFNA secretary for distribution to participants.

3.6 Sample

3.6.1 Sample size and sampling

Eighty-four questionnaires were distributed to the eligible participants. Twenty-six questionnaires were completed and returned. Two questionnaires were returned, unopened, due to incorrect postal addresses as provided by the New Zealand Flight Nurses Association.

3.6.2 Inclusion criteria

The participants for this study were flight nurses living within the geographical boundaries of the Central Regional Ethics Committee. To meet the inclusion criteria the flight nurses were required to be:

1. A registered nurse
2. A financial member of the New Zealand Flight Nurses Association (NZFNA) at 1st March 2007 as identified from the NZFNA membership database.

The rationale for these inclusion criteria would allow for potential recruitment of flight nurses working in both the public and private sectors, from a range of clinical settings. These clinical settings include a wide range of adult, paediatric and neonatal services. The geographical boundaries for this research excluded nurses working in a tertiary paediatric area as the only tertiary paediatric service in New Zealand is from outside the specified geographical boundaries. The inclusion criteria may have excluded some potential participants if they were not financial members of New Zealand Flight Nurses Association.

3.7 Participant Recruitment

The New Zealand Flight Nurses Association secretary, on my behalf, contacted participants. Potential participants received, by mail, an information sheet (Appendix III), and the questionnaire (Appendix IV). A post paid, self-addressed
envelope to return the completed questionnaire to myself as the researcher was included. The information sheet included the following information:

- The purpose of the study
- Details of the researcher and supervisors should any participant have any questions relating to the research
- The anticipated participant input in terms of estimated time involved in completing the questionnaire
- Participant’s right to decline to take part or to withdraw at any point during the study and the right to ask questions about the study
- How participant confidentiality was to be protected and where the results would be published.

Participants were requested to return the completed anonymous questionnaire within one month. As completion and return of the questionnaire by participants was on a voluntary and anonymous basis, a consent form was not included with the research information sheet. The following statement was included on the participant information sheet and research questionnaire “completing and returning this questionnaire will imply your consent as a participant in this research project”.

A reminder postcard (Appendix V) was mailed to all the potential participants, through NZFNA, one week prior to the advertised return date, reminding them to complete and return the questionnaire and thanking those who had returned completed questionnaires.

3.8 Potential Benefits and Risks
The potential benefit of this research to the participants was the new knowledge gained of the perceptions of flight nurses relating to the boundaries of clinical decision making. It was anticipated that this knowledge be utilised to increase the visibility of flight nursing practice in New Zealand and in the further development of educational programmes. No potential harm to participants in this research was anticipated.
3.9 Ethical Considerations

Approval for this study was obtained from the Central Regional Ethics Committee, Hawke’s Bay District Health Board (HBDHB) and Eastern Institute of Technology prior to commencement of this research (Appendix VI).

3.9.1 Cultural Considerations

The significance of involving Maori in research and the need to conduct research which is cross-cultural has been well described (Jahnke & Taiapa, 2003; Spoonley, 2003). With little research in New Zealand involving flight nurses, it was unknown what percentage of flight nurses within the sample who may participate, might identify themselves as Maori. Consultation with the Maori Health Unit at Hawke’s Bay District Health Board was undertaken. A letter of support for the research was received (refer to Appendix VII).

3.9.2 Confidentiality

As described by Haywood (2004) I requested the NZFNA secretary to randomly select five members of the sample, and then send the questionnaire to all but these five members. As I am still involved with flight nursing within the local and central region and personally know many flight nurses, the removal of five potential participants at random by NZFNA provided further protection and anonymity of participants.

The NZFNA secretary mailed all questionnaires to participants. No participant was required to identify themselves; as the questionnaire was anonymous. All completed responses were returned directly back to myself as the researcher via the post-paid self-addressed envelopes, which accompanied the research questionnaire. Participants were not identifiable in any reports or conclusions to this research. All information was kept confidential with all responses assigned a number for data entry and analysis purposes. Data collected will be stored for seven years as required by the Ethics Committee. All research information will be stored securely in a locked filing cabinet and all electronic information will be stored on a password protected file (Allen, 2006).
3.9.3 Conflict of Interest

Part of my current employment as a Clinical Nurse Educator is education and training of new flight nurses within Hawke’s Bay District Health Board (HBDHB). I have previously held the position of Patient Transport Clinical Charge Nurse at HBDHB and have held numerous flight-nursing positions with the NZFNA (Chairperson, Secretary, and Course Coordinator) within the past 10 years. As a result, I know a number of flight nurses within the Central Region. For this reason, geographical location was excluded from the questionnaire. I no longer hold management roles at HBDHB or positions within NZFNA. In an effort to minimise any potential conflict of interest, participant responses were sought with the use of a voluntary anonymous questionnaire.

3.10 Data Collection Method

A quantitative method of data collection was utilised, with the use of a specifically developed questionnaire to seek flight nurses’ perceptions of factors influencing clinical decision making, because there was no other similar data collection tool identified in the literature. The questionnaire collected participant characteristics such as age, gender, nursing education and experience as described in other clinical decision making studies (Bakalis & Watson, 2005; Baumann & Bourbonnais, 1982; Bucknall & Thomas, 1995; Tippins, 2005). The questionnaire utilised a combination of five point ranking scale and a five point numerical rating scale (de Vaus, 1999). The five point scale is regarded as optimal, as most people cannot discern beyond five positions (Tolich & Davidson, 2003).

The data collection tool was divided into two sections; demographic data and influencing factors. Section one requested the following demographic data from the participant:

- Initial nursing registration qualification
- Gender
- Age
- Highest level of qualification obtained
- Ethnicity
• Length of time employed as a flight nurse
• Experience in nursing
• If working towards further professional qualifications

Section two discussed influencing factors, which comprised of eight questions. Participants were required to respond to three questions, which required them to rank, in order of importance (1 being low and 5 being very high). The first two questions were open-ended questions, which enabled the participants to consider their own practice environment and not be restricted by a pre-determined list provided by the researcher.

• What factors do you consider influence your clinical decision making when in the flight nursing role?
• Does the aeromedical environment have any influence on your clinical decision-making?

The third question provided a list of professional development activities and organisational factors and utilising the 1-5 rating scale as described above:

• Rate the influence of each of those on their clinical decision-making.

This list was guided by the findings from the literature review relating to educational orientated material (Holleran, 2004; Smith & Goldwasser, 2003; Weber, Mare, & Battaglia, 1994).

Participants were requested to identify different team configurations in which they worked from a list of pre-determined team configurations. Following this, participants were asked to describe if there was any perceived difference in their clinical decision-making based on those configurations as indicated from the previous question. The rationale for this question was previous studies have identified differences in decision making based on autonomy and interpersonal relationships between nursing and medical staff (Bakalis & Watson, 2005; Bucknall, 2003; Bucknall & Thomas, 1995; Jenks, 1993; Pugh, 2002). I wanted to identify if this was relevant in the flight nurses.
Three further yes-no questions were asked. If a participant responded in the affirmative, they were asked to elaborate how this influenced their clinical decision making:

- Have you completed a flight nursing course?
- Have you completed a postgraduate physical assessment paper?
- Has any other professional development activity, course or study influenced your clinical decision making in flight nursing?

3.11 Reliability and Validity

Reliability and validity are essential in research. Results from research studies need to be accurate and without bias to contribute to and guide nurses clinical practice (Polit & Beck, 2004). Reliability “refers to the accuracy and consistency of information obtained in a study” (Polit & Beck, 2004, p. 35) and the ability of the measuring device to obtain similar results when repeated by different researchers (Bouma & Ling, 2004). Validity is described as a more complex concept and is broadly concerned with the “soundness of the study’s evidence” (Polit & Beck, 2004, p. 36). Validity is the extent in which a measure accurately ‘reflects’ what it is supposed to measure (Groves et al., 2004).

The use of a questionnaire as a data-gathering tool has limitations, particularly a low response rate (de Vaus, 1999; Polit & Beck, 2004; Wood & Ross-Kerr, 2006). A questionnaire does not allow participants to seek clarification regarding understanding on specific questions, which may be a source of misinterpretation of the question and be another cause of non-response.

Pre-testing of the data collection tool evaluates the instrument and participant procedures (Groves et al., 2004) as a means to examine the reliability and validity of the questionnaire. The questionnaire was tested with five registered nurses to ascertain how much time would be required to complete the questionnaire, if the questions and use of rating scales were clearly understood and that the responses obtained were an accurate reflection of the questions asked (Polit & Beck, 2004). Information gained from the pre-testing resulted in the subsequent rewording of one question prior to sending out the questionnaire.
to the actual research sample group. The questionnaire took no more than 20 minutes to complete at this pre-testing stage.

3.12 Management of Data
Questionnaires were returned within one month. Data was entered into a spreadsheet in the same order of questions in the questionnaire. The returned questionnaires were numbered which was used to refer to individual responses during data analysis. The numbering was particularly useful to track responses where additional comments had been added to their questionnaire. Completed questionnaires were filed in a locked filing cabinet and all electronic data was kept in a password protected file.

3.13 Data Analysis
All the data were collated in a central location and then the quantitative data was entered onto computer using a software programme database (Microsoft Excel™) for statistical analysis. All data entry was double checked to ensure accuracy of transcription.

Thematic analysis was utilised to evaluate the unstructured descriptive data gained, to seek patterns and themes that emerged from the textual data (Wood & Ross-Kerr, 2006). From this, frequency categories were developed to examine the characteristics of the participant group of flight nurses. These findings are presented in a descriptive narrative format with excerpts from the respondents given to support and provide a rich description of the themes presented (Polit & Beck, 2004).

3.14 Summary
In this chapter, I have reviewed the methodology for this research project and have discussed the research design. I have included rationale and explanation of the process including aspects of sampling, data collection and ethical considerations. Finally, I have outlined how the data is to be analysed. Chapter four outlines the research results and identification of themes.
4.1 Introduction
Chapter three outlined the methods of data collection and analysis. This chapter provides a report of the findings.

4.2 Demographic Data
4.2.1 Initial Nursing Registration
Participants were asked to identify their initial nursing registration from the three categories provided.

![Initial Nursing Registration Pie Chart]

*Figure 1: Initial Nursing Registration*

4.2.2 Age
The majority of participants (65%) identified themselves as being in the >45 years age category. The remaining participants identified themselves as being in the 35 – 44 years age group (23%) and the 25 – 34 years age group (12%).

4.2.3 Gender
Of the 26 participants, 22 identified themselves as female and three as male. One participant did not answer.
4.2.4 *Highest Qualification*

Twelve participants (45%) held either a postgraduate certificate or postgraduate diploma as their highest qualification. A further two participants held a Master’s degree.

![Pie chart showing highest qualifications](image)

**Figure 2: Highest Qualification**

4.2.5 *Ethnicity*

Ethnicity data were collected by asking each participant to identify their ethnicity as NZ European, Maori, Pacific Island, European or ‘Other’. On collation 73% (n=19) identified themselves as NZ European. The remaining participants identified themselves as ‘Other’, 19% (n=5) and 8% (n=2) as European. Three of the five participants who indicated their ethnicity as ‘Other’, specifically identified themselves as New Zealanders.
4.2.6  Length of Time Employed as a Flight Nurse
As demonstrated, the largest number of participants (n=12) have been employed in the role of flight nurse for two to five years.

![Length of Time Employed as a Flight Nurse](image)

Figure 3: Length of Time Employed as a Flight Nurse

4.2.7  Experience in Nursing
Most participants (n=18) have been working as a Registered Nurse for greater than 15 years.

![Years Experience in Nursing](image)

Figure 4: Years Experience in Nursing
4.2.8 Further Professional Qualifications

Forty six percent of the participants indicated they were currently studying towards further professional qualifications.

<table>
<thead>
<tr>
<th>Type</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bachelor of Nursing</td>
<td>1</td>
</tr>
<tr>
<td>Postgraduate Certificate</td>
<td>2</td>
</tr>
<tr>
<td>Postgraduate Diploma</td>
<td>6</td>
</tr>
<tr>
<td>Masters</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>12</strong></td>
</tr>
</tbody>
</table>

Table 1: Further qualifications currently being studied

4.3 Clinical Decision Making

4.3.1 Clinical Decision Making in Flight Nursing Role

This open ended question sought to identify what factors the participants considered influenced their clinical decision making when in the flight nursing role. Participants could list as many or as few factors as desired although each factor was required to be ranked, using a scale of one to five (one being low, five being very high).

This open-ended question resulted in a total of 144 itemised factors being identified by the participants. There were a broad range of responses, describing either very specific factors and or general category factors. Patterns and themes were identified from itemised factors which resulted in the emergence of six overall themes. These were patient status and assessment, pre-flight planning (non-patient related), time factors, nursing/clinical experience and education, aircraft factors and weather.

Three themes which emerged as being considered ‘high or very high’ (e.g. ranked four or five) collectively by the participants were experience and education of the flight nurse, pre-flight planning, and patient status. Factors within the pre-flight planning theme included resources and support, equipment,
contingency planning, and crew configuration. The theme of patient status included factors regarding age of patient, assessment of patient (either as a physical assessment or telephone assessment) and the potential for deterioration during transport.

![Clinical Decision Making in Flight Nursing Role](image)

**Figure 5: Factors influencing clinical decision making in the flight nursing role**

Of the rankings in the one to three brackets, the theme of ‘time factors’ was substantially higher than the other categories. Included in the theme of time were factors of hours already worked by the flight nurse, anticipated length of the mission especially in relation to the destination/location of the patient and the time of day, for example, was the transport occurring during day light hours or after dark.
Clinical Decision Making in Aeromedical Environment

This also was an open ended question which sought to identify if the aeromedical environment had any influence on the flight nurses clinical decision making. There were a total of 111 responses, where six main themes emerged, some of which are similar to factors in the flight nursing role previously described.

The highest ranking response related to aircraft factors, which incorporated the physical and geographical constraints and stresses of flight associated with working in the aeromedical environment. Pre-flight preparation included factors of flight team skill mix, pre-transport logistics and assessment of safety matters associated with each individual mission. The category of atmosphere incorporated the altered physiology associated with altitude, barometric changes and subsequent gas law (e.g. laws of physics) changes which occur.
This same theme of aircraft was also cumulatively rated the highest in the lower rankings of one to three. Time factors featured also in this ranking.

4.3.3 Team Configurations

There were two sections to this question; the first seeking team configuration and the second any perceived differences in clinical decision making when
working within different team configurations. Nineteen participants worked in more than one type of team configuration, for example, nurse only, nurse and doctor. Six participants indicated they worked only in one type of team configuration; four as nurse only and two as doctor and nurse only. One participant did not answer this question.

Twenty one participants (81%) perceived there to be a difference in clinical decision making when working within different team configurations, with many varied responses given for this difference as illustrated below:

“Decisions can be made and acted on faster in a team situation e.g. nurse and doctor situation”.

“With medical staff, patients are not so stable – medical staff makes most of the decisions, carry the ultimate responsibility”.

“Discussion is possible & clinical decisions/suggestions thought through. I would perceive in Dr/Nurse situation responsibility for clinical decision making is mostly a medical one”.

“Depends on flight experience of other person - if they have relevant flight experience, I tend to let them do direct patient care, and I do the rest. If they have little/no flight experience, I take the lead role”.

“Am relied on to be the specialist of the environment and to run the trip as smoothly as possible”.

“I am responsible for any and all clinical decisions made and consequences of these, with medical back-up that responsibility is lessened and/or shared”.

“Don’t ever work completely alone, always others present e.g. pilot, crew etc”.

4.3.4 Professional Practice

A list of ten professional development activities or organisational factors was provided, requiring the participants to rate these according to their influence on their clinical decision making when in the flight nursing role (1 being low and 5 being very high). No such list was identified in the literature review, I developed this list, being guided by the findings from the literature and relevant standards
of practice and educational orientated material (Holleran, 2004; New Zealand Flight Nurses Association, 2007; Smith & Goldwasser, 2003; Weber, Mare, & Battaglia, 1994).

All participants rated a flight nursing course and the use of policies, procedures and guidelines as being very high in their influence on clinical decision making (refer table 2) in the flight nursing role. The remaining professional development activities or organisational factors were each rated by only some participants. Factors identified by participants for not ranking those activities included lack of knowledge of the professional development activity listed, non-completion or considered not to be required in their area of clinical practice.

<table>
<thead>
<tr>
<th>Professional Development Activity and/or Organisational Factor</th>
<th>Response (n=)</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flight Nursing Course</td>
<td>26</td>
<td>4.88</td>
</tr>
<tr>
<td>Policies, Procedures &amp; Guidelines</td>
<td>26</td>
<td>4.54</td>
</tr>
<tr>
<td>Level 6 Advanced Life Support</td>
<td>21</td>
<td>4.48</td>
</tr>
<tr>
<td>Standing Orders</td>
<td>23</td>
<td>4.17</td>
</tr>
<tr>
<td>Clinical Supervision/Peer Case Review</td>
<td>23</td>
<td>3.83</td>
</tr>
<tr>
<td>Postgraduate Physical Assessment Paper</td>
<td>18</td>
<td>3.83</td>
</tr>
<tr>
<td>Emergency Nursing Paediatric Course</td>
<td>12</td>
<td>3.25</td>
</tr>
<tr>
<td>Postgraduate Pharmacotherapeutics Paper</td>
<td>15</td>
<td>3.21</td>
</tr>
<tr>
<td>Triage Course</td>
<td>18</td>
<td>3.17</td>
</tr>
<tr>
<td>Trauma Nursing Core Course</td>
<td>15</td>
<td>2.93</td>
</tr>
</tbody>
</table>

Table 2: List of professional development and organisational factors

**4.3.5 Flight Nursing Course**

Eighty eight percent (n=23) of the participants responded they had completed a flight nursing course. One participant did not respond to this question. Three different flight nursing courses were identified by the participants, with 87% having completed the New Zealand Flight Nurses Association Introductory Flight Nurses Course.
Participants were asked to specify how the knowledge gained from the flight nursing course had influenced their clinical decision making. All the participants who responded to this question commented on the positive influence the course had made on their clinical decision making. Some examples of this are:

“Knowledge based decision making when calling specific [transport] mode and the ability to convey reasoning’s behind decisions when required”.

“Has enabled me to make sense of sometimes, subtle changes in patient status and highlights [the] precariousness of the whole flight environment”.

“Provided in-depth knowledge regarding the stresses of flight and the impact it can have on patient’s and crew, therefore the increased awareness has been food for thought when clinical decisions need to be made”.

“No-one should be a flight nurse before they have completed the flight nurses course”.

Through these various comments it was also apparent that the completion of a flight nursing course provides a baseline level of knowledge to work within this area of clinical practice.
4.3.6 Postgraduate Physical Assessment Course
Twenty seven percent (n=7) of participants responded that they had completed a postgraduate physical assessment paper. In relation to the influence this course had on clinical decision making various responses were received:

“Importance of pre-flight assessment and history taking”.
“Evaluation of condition of patient and possible changes that may evolve”.
“An awareness of advanced nursing diagnosis”.

4.3.7 Other Professional Development Activity
Sixty five percent (n=17) responded that other professional development activities, course or study influenced their clinical decision making in flight nursing. These activities included clinical in-service education, study days, use of simulation training, support and knowledge from other colleagues, reflective practice, participation in debriefing sessions and conferences. Professional development activities mentioned on more than one occasion were advanced life support in paediatrics or obstetrics, post-registration or a postgraduate critical care course and postgraduate certificate aeromedical retrieval and transport.

4.4 Summary
This chapter has presented the findings of the research study. Multiple factors which flight nurses perceive to influence their clinical decision making in their practice environment have been identified. The findings have identified experience and education of the flight nurse, patient status, pre-flight planning and aviation considerations as factors which influence clinical decision making in the flight nurse and aeromedical practice environment. The significance of a flight nursing course on clinical decision making and practice for these flight nurses has been identified. Whilst participants considered patient status and assessment as being very high, the number of participants with additional postgraduate education regarding physical assessment skills is low.

Chapter five analyses and discusses these findings in relation to the research question, aims, incorporating relevant national and international literature.
Chapter 5
DISCUSSION

“By failing to prepare, you are preparing to fail” - Benjamin Franklin
(1706 – 1790)

5.1 Introduction
The results have demonstrated several factors which flight nurses in this research perceive to influence their clinical decision making in their flight nurse practice. The importance placed of the knowledge gained through completion of a flight nursing course and the subsequent influence on clinical decision making has also been identified. This chapter presents a discussion of the findings and relates these to the national and international literature.

5.2 Discussion
5.2.1 Age, Experience in Nursing and Flight Nursing Employment
Nurses from the over 45 years of age group were the greatest number of participants of the questionnaire; this corresponds with national trends of the nursing workforce population being older (New Zealand Health Information Service, 2004). Although 69% of participants have greater than 15 years of experience in nursing, there were only 31% of total participants with greater than five years flight nursing experience. Reasons for the reduced number of nurses with greater than five years of flight nursing experience by comparison to overall length of experience in nursing of these participants is unknown.

However, a possible contributing factor for this reduced experience as a flight nurse, is that the role of a flight nurse is a relatively new nursing speciality within New Zealand, only recognised in 1996 with the development of a special interest section of the New Zealand Nurses Organisation and the first recognised national flight nurse education programme in 1997 (Houliston, 2002). Additionally, the New Zealand Nursing Council does not have flight nursing identified or listed as a recognised work type on their annual workforce questionnaire which accompanies annual practicing certificate application forms. To identify as a flight nurse on the workforce questionnaire, the
registered nurse must utilise the ‘Other’ box and specify their practice as a flight nurse. The lack of recognition of flight nursing as a recognised role in the New Zealand nursing context is consistent with flight nurses experience in the United Kingdom (Lomas, 2006).

5.2.2 Gender and Ethnicity
Male and female representation in participants reflects the New Zealand Health Information Service Registered Nurse workforce statistics (2004). None of the participants identified as being Maori. The percentage (73%) of participants identifying their ethnicity as NZ European in this research is slightly higher in comparison to the workforce statistics (New Zealand Health Information Service, 2004).

5.2.3 Initial Nursing Registration
There were a similar percentage of participants holding either the RGON (35%) or the RCpN (38%) initial nursing registration. This result was an unexpected finding, given the higher percentage of participants in this research over the age of 45 years (65%). The slightly higher percent of participants registered as a RCpN may be representative of the move from hospital based nurse training to the polytechnic comprehensive training programmes in New Zealand which commenced in mid 1970 (Ministerial Taskforce on Nursing, 1998) or the bridging of enrolled nurses to registered nurse.

5.2.4 Highest Qualification
The Ministerial Taskforce on Nursing (1998) identified that in order to develop advanced or specialist nursing practice roles, prescribing, diagnostic and other skills, postgraduate education programmes were essential. The participants in this research are actively undertaking additional post-registration education with 46% working towards further professional qualifications, with 55% of participants having obtained a postgraduate certificate, postgraduate diploma or Master’s qualification.
5.2.5 Influencing Factors in Clinical Decision Making

The five main themes which emerged as influencing factors in clinical decision making in either the flight nursing role or the aeromedical environment were pre-flight preparation, patient status, experience and education, physical aviation environment, atmospheric environment. Further discussion on these factors are presented.

5.2.5.1 Pre-flight Preparation and Patient Status

Pre-flight preparation and patient status were identified by participants as influencing factors in clinical decision making in the flight nursing role and in the aeromedical environment. These themes of pre-flight preparation and patient status were also identified by those participants who had completed a flight nursing course and had undertaken a postgraduate physical assessment paper, as an influencing factor in their clinical decision making. Participants linked the requirement of pre-flight planning, patient status and complexity and assessment as influencing factors in their clinical decision making, as demonstrated by the following comments:

“Planning more important and assessment skills need to be more thorough, questions to ask, things to ensure are done before take off”.

“More insistent about things that need to be done before leaving with the patient e.g. IV cannula, bloods and x-rays, patient reassessed by house surgeon when I am not happy with their condition…”.

In my flight nursing experience, planning starts immediately the transport is confirmed, with planning closely associated with the current clinical status of the patient. The guiding principle for patient transport is that the level of care during transport must be equal or better than that at the referring hospital (Joint Faculty of Intensive Care Medicine, 2003). The gathering of holistic assessment data (including physical and psychological) of the patient is vital to commence the transport process, as this guides the initial clinical decision making for selection of transport crew members, equipment and transport vehicle, for example pressurised or unpressurised fixed wing aircraft or helicopter. This planning phase may need to be completed within a very short timeframe for example,
within 30 minutes, as in an emergency retrieval/transport or may be undertaken over several days, as when planning an international transport. The ability to plan for such missions, especially in the emergency situation, requires an expert flight nurse to function in a fast, efficient manner, yet have a strong ability to communicate their reasoning. This planning is often being done in conjunction with other tasks such as gathering equipment and other relevant documentation. In the emergency setting there is little ability to get to ‘know’ the patient, which may be done if planning occurs over several days.

Planning for patient transfers is identified in the New Zealand literature, with the theme ‘planning’ being a focus in exemplars published in the New Zealand Flight Nurses Association magazine (Hiko, 2002; Murray, 2000; Pantano, 2002). Brookes (2001) also identifies planning for transfers through her participants stories of flight nursing. The focus of planning considers what type of portable equipment is required, what is the best team configuration for the particular patient, but also of the planning for achieving and maintaining patient stability prior to transport. Planning for transport is supported in the international literature (Holleran, 2004; Lomas, 2006), as is the influence of patient complexity and stability in clinical decision making (Bucknall, 2003).

Another component of pre-flight preparation is the availability of policies, procedures and guidelines to the flight nurse. In this research, the participants rated highly the influence of policies, procedures and guidelines on their clinical decision making in flight nursing practice. This high rating by the participants, may be associated with the overall lower years of experience as a flight nurse in this study group, and supports the analytical perspective, utilising step-by-step conscious and logically defensible decision making process (Lauri et al., 2001).

The selection of cues from patients is an important first step in decision making, which is essential for patient stability required for transport. The findings relating to pre-flight preparation and utilisation of policies and procedures support the use of the theoretical perspective of hypothetico-deductive model of rational/analytical decision making processes (Bucknall & Thomas, 1995; Carnevali & Thomas, 1993; Harbison, 1991; Muir, 2004) by the flight nurses in
this research. The use of intuition has not been clearly identified in this research as an influencing factor in clinical decision making for flight nursing practice.

5.2.5.2 Experience and Education
Flight nursing practice encompasses a large component of safety practices in addition to an expansive clinical experience and broad knowledge base (Holleran, 2003). Participants in this research linked the completion of a flight nursing course and the knowledge gained from this as a high influence on their clinical decision making, in addition to their previous clinical experience and professional development. Participants describe this linking of completion of a flight nurses course to knowledge, clinical practice and decision making:

“[The course made me] more aware of the environment we are working in and the complications that can arise with inadequate preparation of patients”.

“Has enabled me to make sense of sometimes subtle changes in patient status and highlights the precariousness of the whole flight environment”.

“Knowledge based decision making when calling specific mode and the ability to convey reasoning’s behind decisions when required”.

“Provided in-depth knowledge regarding the stresses of flight and the impact it can have on patients, and crew, therefore the increased awareness has been food for thought when clinical decisions need to be made”.

The New Zealand Flight Nurses Standards of Practice (2007) state that:

Flight nurses must extend the principles of novice through expert nursing practice into the aviation environment, while recognising that the provision of competent flight nurse practice requires a sound knowledge and understanding of the physiological effects of altitude and the aviation environment as a workplace (p. 3).

This statement describes what is required for competent practice as a flight nurse; however the New Zealand Flight Nurses Association does not have any
standard, specific definition or link to the national framework for professional
development recognition programmes, in which to assess attainment in the
proficient or expert level as a flight nurse. The use of clinical reasoning and
judgement, a breadth of practice-based procedural knowledge, the ability to
reflect on practice, skill acquisition, high motivation and internal drive have been
suggested as dimensions of expertise and incorporated into the expert nurse
level of practice (Higgs & Titchen, 2001). The challenge is to build the capacity
to continue to enhance the abilities of flight nurses to progress towards the goal
of expert practitioner.

The Health Practitioners Competence Assurance Act (2003) requires nurses to
work within their scope of practice (Nursing Council of New Zealand, 2004).
The scope of practice for a registered nurse requires the nurse to use nursing
knowledge and complex nursing judgement when performing patient
assessment and providing patient care. Without the understanding and
application of knowledge gained through completing a flight nursing course
these legislative requirements may not be met.

One participant mentioned the use of simulation training as an influencing factor
in their clinical decision making. The use of simulation training has been used
in the healthcare environment for more than 15 years with a rapid growth in
computerised simulation training in the past few years (Seropian, Brown,
Gavilanes, & Driggers, 2004). The widespread use of simulation training for
flight nurses is not evident in this study population, however, this could be
utilised to support and develop the novice flight nurse’s ability to think critically,
act quickly, communicate effectively and develop clinical decision making
capability, which may assist in meeting the legislative requirements for the
registered nurse scope of practice.

Other authors support these views of this research that link clinical experience
(Bakalis, 2007; Baumann & Bourbonnais, 1982), education and academic
exposure (Bakalis, 2007; Taylor-Piliae, 1998), conference attendance (Taylor-
Piliae, 1998), reading of literature (Taylor-Piliae, 1998), as having an influence
on clinical decision making
5.2.5.3  

Physical Aviation and Atmospheric Environment

Holleran (2003) emphasises that nursing a patient in the aviation environment is significantly different to nursing the patient in the security and stability of a hospital. The physical aviation environment was rated highly by participants as an influence on their clinical decision making. Of the total 111 responses to this question, 53 responses (48%) indicated that the physical nature and constraints of the aviation environment was an influencing factor in clinical decision making.

The air medical transport environment may not always be conducive to performing all the components of patient assessment and preparation that are necessary. The size of the cabin, limits of space for storage and inability to arrange emergency equipment and drugs can inhibit the access to equipment in a timely manner. Edwards (1992) explains that patients and staff alike are exposed to an altered physical environment and an altered working environment. The physical considerations are vibration, pressurisation, depressurisation, turbulence, noise, thermal stress, vestibular disturbances, fatigue and motion sickness. This finding is consistent with the others in the literature as an influence on clinical decision making (Holleran, 2003; Pugh, 2002).

To provide optimal patient care in the aviation environment, knowledge of aviation physiology is essential. Aviation physiology describes the relationships between the concepts of gas laws and the variables of temperature, pressure, volume and mass of gases (Holleran, 2003). It is the effect of aviation physiology on the patient and personnel that will determine the choices of nursing and medical care. Participants identified a relationship between the knowledge of the atmospheric environment and the influence of clinical decision making.

“[Flight course] made me aware of the physiology of flight that has potential to impact on already ‘ground-based’ situations”.

One participant commented on the benefit of attending a flight nursing course on her decision making regarding the aviation and atmospheric environment:
“How the effects of altitude and the aviation environment impact the patient and the patient care”.

It is difficult to separate out the effects of the physical aviation environment and the atmospheric environment and the influence they both have on clinical decision making, as they are inextricably linked (Edwards, 1992; Pugh, 2002).

5.2.6 Team Configuration

Mixed responses were received from the participants in relation to clinical decision making within different team configurations. Nursing Council of New Zealand competences for the Registered Nurse Scope of Practice states that the Registered Nurse “accepts responsibility for ensuring that his/her nursing practice and conduct meet the standards of the professional, ethical and relevant legislated requirements” (2005, p. 3). Overall, 81% of participants in this research identified differences in clinical decision making based on different team configurations in which they worked, ranging from the collaborative nature within clinical practice, through to the perception of the medical person being in control. This perception of medical staff being in control and making the decisions was identified in the literature by Hoffman, Duffield and Donoghue (2004) who asserted senior staff rather than the nurse at the beside make the decisions.

In the doctor/nurse team configuration, mixed responses indicated that although discussion and planning might be done as a team, the medical staff were perceived to possess the expert clinical knowledge and would be relied upon to make the clinical decisions and carry the responsibility and accountability as evidenced by the following statements provided by participants:

“Decisions can be made and acted on faster in a team situation e.g. nurse and doctor situation”.
“Doctor accepts responsibility for most medical decisions”.
“With medical staff, patients are not so stable – medical staff makes most of the decisions, carry the ultimate responsibility”.
Ten participants perceived that the level of experience (clinical or aeromedical) of the medical staff member made a difference in their clinical decision making, in that they considered they needed to ‘step-up’ into the senior team member role as demonstrated with the following:

“Discussion is possible & clinical decisions/suggestions thought through. I would perceive in Dr/Nurse situation responsibility for clinical decision making is mostly a medical one”.

“Depends on flight experience of other person - if they have relevant flight experience, I tend to let them do direct patient care, and I do the rest. If they have little/no flight experience, I take the lead role”.

Five participants perceived when working with a doctor, the flight nurse was the specialist within the aviation environment and was expected to manage the many technical and logistical aspects of the transport to ensure a safe transport outcome.

“Am relied on to be the specialist of the environment and to run the trip as smoothly as possible”.

In the doctor/nurse team configuration, findings indicate that nurses appear to be ‘handing over’ to medical control the nursing responsibility and decision making. This perceived lack of responsibility and accountability by the flight nurses for clinical decision making and collaborative practice is not aligned with the competencies for the registered nurse scope of practice (Nursing Council of New Zealand, 2005). This lack of clinical decision making by nurses when working within the doctor/nurse team configuration, may be associated with the hierarchical nature of medical control, with more senior staff making the decisions, not the nurse at the beside (Bucknall & Thomas, 1995; Hoffman, Duffield, & Donoghue, 2004). As Pirret (2007) asserts, “if nurses are not encouraged to think autonomously on a regular basis, they risk losing competence in their decision making abilities” (p. 154).
However, when working in a flight nurse only configuration, participants had no difficulty in identifying they were responsible for autonomous clinical decisions and managing adverse events as demonstrated by the following two comments:

“I am responsible for any and all clinical decisions made and consequences of these, with medical back-up that responsibility is lessened and/or shared”.

“Understand limitations of being on my own clinically, a risk as options limited if things go “belly up”.

The findings of autonomous nursing clinical decision making, particularly under emergency situations, in the absence of medical staff, is supported in the literature. Bakalis (2007) and Prescott, Dennis and Jacox (1987) in their research, identified in emergency situations, that when doctors are absent, nurses independently made decisions and implemented actions that normally would require doctor involvement. In the nurse only patient transports, this type of clinical decision making is imperative if an adverse patient event occurred at any stage during transport.

Nine participants responded they utilised a different team configuration, which was a nurse and midwife, two nurses or a nurse and crew member/anaesthetic technician. Similar differences in clinical decision making were identified with other team configurations as when working with medical staff.

“When transporting pregnant women accompanied by midwife, I leave some clinical decisions to the midwife and my role is to facilitate the seamless flow of transport”.

The flight nurse is again seen as providing the seamless process of transport, utilising specialist knowledge of the aviation environment and delegating the level of clinical decision making required to another health professional.

Four participants perceived changes in their clinical decision making when working with an ambulance officer, crew member or anaesthetic technician as
part of the flight team configuration. Two participants specifically commented in relation to their decision making when working with these personnel:

“Different levels of knowledge and I consider what support they offer”.  
“Don’t ever work completely alone, always others present e.g. pilot, crew etc”.

The Health Practitioners Competence Assurance Act (HPCA) (2003) identifies the registration authorities and the health practitioners registered under this Act. None of the three groups identified by the flight nurses i.e. ambulance officer, crew member or anaesthetic technician are registered with a scope of practice in accordance with the HPCA Act (P Andrew, personal communication, October 16, 2007). Nursing Council of New Zealand competences for the Registered Nurse Scope of Practice states that the Registered Nurse “demonstrates accountability for directing, monitoring and evaluating nursing care that is provided by nurse assistances, enrolled nurses and others” (2005, p. 3). This raises the questions, should clinical decision making by nurses differ when working with these unregistered personnel? Is the Registered Nurse accountable for the actions or inactions of these personnel? The difference in clinical decision making by nurses, when working with unregistered health professionals, may be related to the development and utilisation of the crew resource management model being introduced into the healthcare environment.

The concept of team crew resource management (CRM) has been used in the aviation industry for nearly 30 years and was developed to reduce the incidence of human errors and related air transportation accidents. The tools and applications of CRM create enhanced communications focused on team centred decision making systems. Crew resource management can be defined as a management system which makes optimum use of all available resources, including equipment, procedures and people, to promote safety and enhance the efficiency of flight operations (Powell & Hill, 2006).

The model of CRM is gaining momentum within the healthcare industry in an effort to reduce adverse outcomes (France et al., 2005). Flight nurses who
work within a crew resource management framework do so in an environment of open communication, crew and team coordination, and active participation in decision making to promote safety and to increase overall team performance. Using the principles of crew resource management, flight nurses utilise all resources at hand to assist with clinical decision making, which includes all personnel.

5.2.7 Physical Assessment Paper

Participants who had completed a postgraduate physical assessment paper (n=7 or 27%) commented that their clinical decision making had altered as a result of completing this type of course as it increased their confidence and gave them advanced assessment skills. Two participants commented how their clinical decision making was influenced:

“In-depth assessment skills and knowledge, ability to understand and carry out an assessment and seek further assistance as needed”.

“Increases confidence and in-depth in my practice”.

Given the effect of the physical aviation environment, physiological changes related to altitude and the perceived influence of pre-flight preparation and clinical assessment on clinical decision making, the findings of this research show limited participation by nurses who have undertaken postgraduate physical assessment paper. This is an interesting and unanticipated finding given the significance participants have placed (as discussed earlier in the results) on patient assessment and planning prior to transport as influencing factors in clinical decision making in the flight nurse practice environment. Incorporated into postgraduate physical assessment papers are the elements of diagnostic reasoning and advanced nursing diagnosis. Elements of diagnostic reasoning utilised by participants were identified in discussing the impact the flight course had on their clinical decision making practices.

The benefit of a nursing physical assessment, which obtains accurate patient information, which is clearly communicated and effectively applied to nursing care, will be beneficial to the patient and the wider health team. Studies have
shown many health care providers, including registered nurses perceive physical assessment is a medical function (Schroyen, George, Hylton, & Scobie, 2005). However, some participants identified words such as ‘knowledge based decision making’, ‘convey reasoning’, ‘increased ability to problem solve’ and an ‘awareness of advancing nursing diagnosis’ to describe their practice in relation to clinical decision making. These descriptions relate to diagnostic reasoning rather than just the mere physical assessment skills. The term diagnostic reasoning is one which is used interchangeably in the literature with the term clinical decision making (Pirret, 2007; Turner, 2005). As no specific definition of clinical decision making was provided to the participants, participants were free to place their own interpretation on the term clinical decision making.

5.3 Conclusion
This chapter has discussed the key findings of this study in relation to the New Zealand context and international literature. The results of this research support findings in other studies. The influences in clinical decision making identified in this research include pre-flight preparation, patient status, experience and education and the physical aviation and atmospheric environments. These influences in clinical decision making in flight nursing are multi-factorial and the utilisation of intuitive and analytical frameworks is present in decision making processes. This study has highlighted key areas within flight nursing practice that need to be developed if flight nurses are to meet their legislative and professional nursing responsibilities, particularly in relation to education and utilisation of physical assessment skills and diagnostic reasoning.

Having discussed the research results in relation to the New Zealand context and international literature, the final chapter provides an overview of this thesis; discuss the limitations of this study and future directions this research has illuminated.
Chapter 6
CONCLUSION AND RECOMMENDATIONS

“If you have knowledge, let others light their candles with it” – Margaret Fuller (1810-1850)

6.1 Introduction
This chapter provides a summary of the study, findings, and suggestions for practice and recommendations for the future. The research question sought to identify what perceptions flight nurses have about the factors that influence clinical decision making in their practice environment. The aims of this research were two-fold:

1. To determine flight nurses perceptions relating to clinical decision making in flight nurse practice.
2. To explore and describe the dimensions of flight nursing practice within the New Zealand context.

To answer these questions a quantitative non-experimental descriptive research study was designed. Twenty six of a potential 84 participants were enrolled in the study.

Information from the review of the literature identified the models of decision making, but more importantly that clinical decision making is a blend of qualitative and quantitative components. Clinical decision making changes, depending on the experience of the individual nurse. The review of the literature also identified a paucity of New Zealand research on flight nursing practice in general.

This chapter discusses the summary of findings from this study in relation to the research question. Limitations will be discussed, recommendations will be presented and finally areas for future research will be identified.
6.2 Summary of Findings

This study identified five key areas which flight nurses perceive influence their clinical decision making in the flight nursing practice role. These include pre-flight preparation, patient status, experience and education of the nurse, and the challenges associated with the physical and atmospheric environments.

The flight nurses demonstrated a clear perceived difference in clinical decision making based on the team configuration in which they were utilising at the time of transport. Experience of other team members present was a contributing factor as to whether the flight nurse was the senior clinician or was considered as the person with the specialist and technical knowledge of the aviation environment.

All participants highly rated the importance of completing a flight nursing course as a professional development activity which had an influence on their clinical decision making. A flight nursing course was considered the minimum requirement for practising in this environment.

Few participants had completed a postgraduate physical assessment paper, yet many identified diagnostic reasoning, advanced nursing diagnosis as some of the influences in their decision making. These terms are used interchangeably in the literature and were evident with the participants in this study.

6.3 Limitations

6.3.1 Sample

The potential population for this study was 84 and with a recruitment of only 26 participants, the sample size is small. The geographical region utilised for this study did not have representation of all flight nurse clinical specialties, in particular, nurses from a tertiary paediatric intensive care. This makes it more difficult to generalise the results as this area is not entirely representative of the total flight nurse population within New Zealand. A larger study would be required to be representative of this study population.
6.3.2 Definition of Clinical Decision Making

A specific definition of clinical decision making was not provided as part of the questionnaire, therefore participants were free to place their own definition, values and practices onto the term clinical decision making. Had a specific definition been given, it is possible that a different set of responses may have been received.

6.3.3 Professional Development Recognition Programme/Appointment Level

This research did not consider nurses appointment level, something that was identified by Bucknall and Thomas (1995) as contributing to critical care nurses’ decision making. This study missed an opportunity to examine the relationship between levels of practice (as defined by the national professional development recognition programme framework) and the perceived influences on clinical decision making.

6.3.4 Methodological Considerations

The use of a questionnaire which asks participants to consider influences on their practice is a limitation. Questionnaires do not allow participants or the researcher, to seek clarification on questions or to the responses given (Polit & Beck, 2004), particularly in regards to the question regarding professional development activities (Polit & Beck, 2004). This inability to seek clarification may have been a factor with participants when ranking the professional development activities specified within the questionnaire.

6.4 Recommendations

The recommendations from this study include the following:

1. There is a need for ongoing awareness and comprehension by registered nurses regarding accountability, supervision and delegation of practice in relation to professional and legislative requirements. This is of particular importance when flight nurses are making clinical decisions and are working with other members of the health team who are not registered health professionals under the Health Practitioners Competence Assurance Act (2003).
2. For nurses, patient assessment is a competency which must be met under the Registered Nurse scope of practice and is assessed as part of the annual competency base practicing certificate requirements (Nursing Council of New Zealand, 2005). Flight nurses are therefore responsible for ensuring they have the appropriate knowledge and skills associated with physical assessment to meet the unique demands of the aviation environment and the potential impact this may have on their patients.

6.5 Recommendations for Future Research
A limitation of this study is the small sample size. To increase the sample size a larger national study would need to be conducted utilising mixed methodologies research, such as a self-reported questionnaire and follow-up focus group interviews. Focus group interviews may assist to support the themes identified through the questionnaire and elicit further information about the use of intuition and tacit knowledge of this group. Alternatively, participants from across New Zealand could be sought for a qualitative study on the patient outcomes from clinical decision making in the nurse-only transport setting.

Given the importance placed by participants of patient status and assessment as an influencing factor in their clinical decision making there needs to be further research conducted on the utilisation and type of physical assessment skills performed by flight nurses. As previously discussed an accurate, holistic nursing assessment would be beneficial for the patient and wider health team.

The use of simulation training to further support the development of crew resource management for all members of the aeromedical crew is considered for inclusion into aeromedical training and education programmes. This may provide skill development in a ‘real time’ practice environment, and promote communication and crisis management within the aeromedical team and enhance team performance.

6.6 Final Comments
In conclusion, this study, although of a small size, has demonstrated some key findings which will add to the body of knowledge regarding flight nursing. This
study will also act as a beginning platform for further nursing research on this topic in New Zealand.
REFERENCES


APPENDIX I

Letter from New Zealand Flight Nurses Association
Dear Sally,

I would like to inform you that the NZFNA executive committee have considered your request to assist you with your research for your Masters of Nursing by having access to the NZFNA database, via the NZFNA secretary.

In order to maintain confidentiality and anonymity of the NZFNA members we have agreed that the NZFNA secretary will post an information sheet and questionnaire, to all those flight nurse members who have identified themselves as living within the Central Region.

We wish you well in your study and will be interested in your findings.

Best Wishes,

Jo Dobson
NZFNA Secretary.
APPENDIX II

Central Regional Ethics Committee Approval
1 March 2007

Sally Houlston
Hawkes Bay DHB
30 Avenue Road
Greenmeadows
Napier

Dear Sally

CEN/07/02/007 - Flight nurses perceptions of factors influencing clinical decision making in their practice environment

The above study has been given ethical approval by the Central Regional Ethics Committee.

Accreditation
The Committee involved in the approval of this study is accredited by the Health Research Council and is constituted and operates in accordance with the Operational Standard for Ethics Committees, April 2006.

Final Report
The study is approved until March 2008. A final report is required at the end of the study and a form to assist with this is available from the Administrator. If the study will not be completed as advised, please forward a progress report and an application for extension of ethical approval one month before the above date. Report forms are available from the administrator.

Amendments
It is also a condition of approval that the Committee is advised of any adverse events, if the study does not commence, or the study is altered in any way, including all documentation eg advertisements, letters to prospective participants.

Please quote the above ethics committee reference number in all correspondence.

It should be noted that Ethics Committee approval does not imply any resource commitment or administrative facilitation by any healthcare provider within whose facility the research is to be carried out. Where applicable, authority for this must be obtained separately from the appropriate manager within the organisation.

Yours sincerely

Claire Yendoll
Central Ethics Committee Administrator
Email: claire_yendoll@moh.govt.nz
APPENDIX III

Participant Information Sheet
FLIGHT NURSES PERCEPTIONS OF FACTORS INFLUENCING CLINICAL DECISION MAKING IN THEIR PRACTICE ENVIRONMENT

The purpose of this research study is to explore the flight nurses perceptions of factors influencing clinical decision making in their practice environment. This information has been forwarded to you on my behalf through the New Zealand Flight Nurses Association.

My name is Sally Houliston. This research study will form the thesis component for a Master of Nursing being undertaken at the Eastern Institute of Technology. My contact details are as follows:

Researcher: Sally Houliston, RN, BN, PG Dip (HSc) MN Candidate
(06) 878 8109 ext 4505 or 027 223 1823

Research Supervisors: Dr. Elaine Papps, RN, PhD
Professor of Nursing, Eastern Institute of Technology
(06) 974 8000 ext 6116

Judy Seale, RN, MN
BN Programme Manager
Eastern Institute of Technology
(06) 974 8000 ext 5010

About The Study
The purpose of this research is to explore and describe the flight nurse’s perceptions of factors influencing clinical decision making in their practice environment. It is recognised that the role of the flight nurse requires varying degrees of autonomy, accountability and independent decision making. An abundance of research exists in the area of clinical decision-making within different nursing occupational groups; however there is limited research that specifically discusses clinical decision-making in the flight-nursing environment.

Aims of the Research
The aims of the research are to:
1. Explore and describe the dimensions of flight nursing practice and
2. To determine flight nurse’s perceptions relating to the boundaries of independent decision making in clinical practice

Participation
The attached questionnaire has been sent to all nursing financial members of NZFNA within the Central Region (Hawke’s Bay, Hutt, Manawatu, Taranaki, Wairarapa, Wanganui and Wellington). You are invited to participate in this research. In doing so, you will have the opportunity to express your perceptions of factors which influence clinical decision making in flight nursing. If you choose to participate, please complete and return the attached anonymous questionnaire.
The questionnaire will take approximately 20 minutes to complete and comprises questions relating to your perception of factors which influence clinical decision making in clinical practice as a flight nurse. I invite you to add additional comments if you wish. Participation is on a voluntary basis. There are no anticipated risks to you if you choose to participate.

A reminder postcard and/or email will be sent to you one week prior to the due return date of the questionnaire.

Informed Consent
Completing and returning this questionnaire will imply your consent as a participant in this research project. This is an anonymous process, so if you choose to participate, please do not put your name or any other information that may identify you on the questionnaire.

You have the right to:
1. Decline to participate in this study (which means you do not need to fill in or return the questionnaire).
2. Withdraw from the study at any time until the questionnaire has been returned.
3. Ask any questions about the study at any time during participation.
4. Provide information on the understanding that your name will not be used unless you give permission to the researcher (the questionnaire is anonymous and does not required you to provide your name).
5. Be given access to a summary of the findings of the study when it is concluded.

Confidentiality
1. The only persons who will have access to the data are the researcher, the research supervisors and the professional typist.
2. No material which can personally identify you will be used in the writing of this study.
3. When the final research report has been completed and examined, all questionnaires will be destroyed.
4. All information will be stored securely (by the researcher) in a locked filing cabinet.
5. All electronic information will be stored on a computer with a password that only the researcher has access to.

Ethical Approval
This study has received ethical approval from the Ministry of Health Central Regional Ethics Committee and the Hawke’s Bay District Health Board Research Coordination Committee.

If you have any queries or concerns regarding your rights as a participant in this study, you may wish to contact the Margaret Cain, Professional Nursing Advisor, New Zealand Flight Nurses Association (NZNO) phone 09 377 4946.

Please return your completed questionnaire, in the self-addressed, reply-paid envelope provided, to the Researcher, by 30th April 2007.

Sally Houliston
Researcher, Master of Nursing Student
APPENDIX IV

Data Collection Tool (Questionnaire)
It is assumed that filling in and returning this questionnaire implies your consent.

Section 1 – Demographic data

Please tick one of the following options for each question

<table>
<thead>
<tr>
<th>Question</th>
<th>Options</th>
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<tbody>
<tr>
<td>Initial Nursing Registration</td>
<td>RGON ☐, RCpN ☐, RN ☐</td>
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<tr>
<td>Gender</td>
<td>Female ☐, Male ☐</td>
</tr>
<tr>
<td>Age</td>
<td>25 – 34 years ☐, 35 – 44 years ☐, &gt; 45 years ☐</td>
</tr>
<tr>
<td>Highest Level of Qualification Obtained</td>
<td>Bachelors Degree ☐, Postgraduate Certificate ☐, Postgraduate Diploma ☐, Masters Degree ☐, Other ____________________ ☐</td>
</tr>
<tr>
<td>Ethnicity</td>
<td>NZ European ☐, Maori ☐, Pacific Island ☐, European ☐, Other ____________________ ☐</td>
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<tr>
<td>Length of time employed as a Flight Nurse</td>
<td>&lt; 1 year ☐, 1 – 2 years ☐, 2 – 5 years ☐, &gt; 5 years ☐</td>
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<tr>
<td>Length of experience in nursing</td>
<td>0 – 5 years ☐, 5 – 10 years ☐, 11 – 15 years ☐, &gt; 15 years ☐</td>
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<td>Are you currently working towards further professional qualifications?</td>
<td>Yes ☐, No ☐</td>
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<td>If yes – please specify</td>
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Section 2
This section is seeking your views on the factors which influence your clinical decision making when nursing in the aeromedical/flight environment.

What factors do you consider influence your clinical decision making when in the flight nursing role? Rank these items in order of priority, using a scale of 1 – 5 (1 being low and 5 being very high).

<table>
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<tr>
<th>Factors</th>
<th>Ranking</th>
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</table>

Considering your flight nurse role - what team configuration/s do you work within when practising as a flight nurse?

- Nurse only
- Nurse and Doctor
- Other ____________________

Do you perceive there to be a difference in your clinical decision making when working within different team configurations?

- Yes ☐
- No ☐

If yes, please specify any differences

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________
Does the aeromedical environment have any influence on your clinical decision making? Rank these items in order of priority, using a scale of 1 – 5 (1 being low and 5 being very high).

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<th>Factors</th>
<th>Ranking</th>
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</table>

Consider each of the following and rate their influence on your clinical decision making in flight nursing practice.

<table>
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<tr>
<th>Factors</th>
<th>Low</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>Very High</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level 6 Advanced Life Support (NZ Resuscitation Council)</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Clinical supervision and/or peer case review</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Emergency Nursing Paediatric Course (ENPC)</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Flight Nursing Course</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Postgraduate physical assessment skills paper</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Postgraduate pharmacotherapeutics paper</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
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<td>Trauma Nursing Core Course (TNCC)</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
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<td>Triage Course</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Standing Orders (medications)</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Specific flight nursing clinical policies, guidelines and/or procedures</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>
Have you completed a flight nursing course?  Yes ☐  No ☐
If yes, please specify, which organisation/institution and duration of course

________________________________________________________________________

How has the knowledge gained from this course influenced your clinical decision making?

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

Have you completed a postgraduate physical assessment paper?  Yes ☐  No ☐
If yes, please specify
How has the knowledge gained from this course influenced your clinical decision making?

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

Has any other professional development activity, course or study influenced your clinical decision making in flight nursing?  Yes ☐  No ☐
If yes, please specify

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

Thank you for taking time to complete this questionnaire
Please return your completed questionnaire in the attached self-addressed envelope, to:
Sally Houliston
Researcher
C/- 30 Avenue Road, Greenmeadows, Napier 4112
By 4pm, 30th April 2007
APPENDIX V

Reminder Postcard
REMINDER

FLIGHT NURSES CLINICAL DECISION MAKING QUESTIONNAIRE

Have you remembered to fill in and return your questionnaire?

If you want to have the opportunity to express your perceptions of factors which influence clinical decision making in clinical practice as a flight nurse, please return your questionnaire in the envelope provided, to the:

Researcher
30 Avenue Road, Greenmeadows, Napier, by 30th April 2007

THANK YOU TO THOSE OF YOU WHO HAVE ALREADY RESPONDED
APPENDIX VI

Eastern Institute of Technology Research Approval
8 June 2007

Sally Houliston
Hawke's Bay DHB
30 Avenue Road
Greenmeadows
NAPIER

Dear Sally

Your research project no. 13/07, 'Flight Nurses perceptions of factors influencing clinical decision making in their practice environment has been examined by the Research Approvals Committee.

I am pleased to advise that the Committee has approved your project for a period of two years, ending in May 2009.

We wish you well for the project.

Yours sincerely

[Signature]

Margaret McLeay
Secretary
Research Approvals Committee

EASTERN INSTITUTE OF TECHNOLOGY
MAIN CAMPUS Gloucester Street, Private Bag 1201, Taradale, New Zealand. Telephone 06 974 8000, Facsimile 06 974 8910
HASTINGS CENTRE Cnr Lyden & Railway Roads, PO Box 1477, Hastings. Telephone 06 878 4738, Facsimile 06 878 2965
CENTRAL HAWKE'S BAY CENTRE 95 Russell Street, PO Box 250, Waiapu. Telephone 06 858 7099, Facsimile 06 858 7018

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APPENDIX VII

Letter of support from Maori Health Unit
21 February 2007

Sally Houliston
Clinical Nurse Educator
Hawke’s Bay District Health Board
HASTINGS

Dear Sally

Re FLIGHT NURSES CLINICAL DECISION MAKING RESEARCH

I have had the opportunity to review your research proposal regarding the consistency with the Treaty of Waitangi provisions.

Your research question is sound and you have acknowledged reading the guidelines for researchers and the impact on Maori.

I acknowledge you have reflected on the potential impact on Maori participants and support your documented research project.

Yours faithfully

[Signature]

TRACEE TE HUIA
Director Maori Health

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TE WAHANGA HAUORA MÄORI
Corporate Services, Hawke’s Bay District Health Board

Omahu Road, Private Bag 9014, Hastings, New Zealand - Telephone (06) 878 8109 Fax (06) 878 1374
Email: tracee.tehuiia@hawkesbaydhb.govt.nz

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