PERCEPTIONS OF PATIENTS’ POST CORONARY ARTERY BYPASS GRAFTING SURGERY RELATED TO HEALTH RELATED QUALITY OF LIFE AND SATISFACTION WHEN NURSE PRACTITIONERS ARE ACTIVE PARTICIPANTS IN CARE

A Dissertation in Nursing

by

Patricia Demko Sweeney

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The dissertation of Patricia Demko Sweeney was reviewed and approved* by the following:

Mona Counts  
Eloise Ross Eberly Professor of Nursing  
Dissertation Advisor  
Chair of Committee  

Kim Kopenhaver Haidet  
Assistant Professor of Nursing  

Carol Smith  
Associate Professor Nursing  

Edgar Paul Yoder  
Professor of Agriculture and Extension Education  

Paula Milone-Nuzzo  
Professor of Nursing  
Dean of the College of Nursing  

*Signatures are on file in the Graduate School
ABSTRACT

The issue of quality health care has a renewed focus since the Institute of Medicine’s 2000 report and has become a primary concern for patients, providers, and payors. Quality needs to be addressed from the perspective of the patient, incorporating patient-centered preferences in all areas where care is received; with special attention for high frequency, high cost, high-risk populations that evaluates all types of providers. The primary aim of this study is to describe patient perceptions of health related quality of life (HRQOL) and satisfaction for patients hospitalized for coronary artery bypass grafting (CABG) surgery when Nurse Practitioners (NP) are active participants in care. Secondary aims of the study were to: describe the outcomes: adverse events (pulmonary, urinary tract, and wound infections); cost of care; mortality; and hospital re-admissions; and the role of the Nurse Practitioner for patients having CABG surgery. The Quality Health Outcomes Model was used as the foundation for the research. A prospective descriptive multi-site study using a criterion-based sample to select individuals having CABG surgery in mid to large size, non-Magnet community hospitals in northeastern, central, or southeastern Pennsylvania was used. Data was collected from four sources: two surveys, the Short Form-36, version 2 for HRQOL and the Patient Judgment System for patient satisfaction; a Chart Review Tool; and a NP survey.

Participants were enrolled (N = 91) at two hospitals, with one NP at each facility. Primary data analysis was descriptive with secondary analyses performed to identify the presence of relationships among the study variables. Findings indicated participants had
high satisfaction with all aspects of hospitalization and HRQOL mental health; and low scores for HRQOL physical role and physical component score. Mortality and cost of care were lower than State averages, while adverse events and re-admissions were higher than State averages. NPs were actively involved in patient care and spent 80% of their time in direct patient care activities. Implications include the need for continued research, using quasi-experimental designs to identify a cause and effect relationship between the use of NPs and selected patient outcomes.
# TABLE OF CONTENTS

LIST OF FIGURES ................................................................................................................... ix
LIST OF TABLES .................................................................................................................... x
ACKNOWLEDGEMENTS .......................................................................................................... xi

Chapter 1  Introduction ........................................................................................................... 1
  Background ......................................................................................................................... 1
  Statement of the Problem ................................................................................................. 7
  Study Aims ......................................................................................................................... 8
  Theoretical Framework .................................................................................................... 9
    Propositions .................................................................................................................... 14
  Research Questions ........................................................................................................ 16
  Definitions ........................................................................................................................ 17
    Quality of Health Care ............................................................................................... 17
    Effectiveness ............................................................................................................... 17
    Perceived Health Related Quality of Life ................................................................. 18
    Perceived Patient Satisfaction ................................................................................... 19
    Outcomes ...................................................................................................................... 19
    Nurse Practitioner ...................................................................................................... 20
  Significance ...................................................................................................................... 22
  Assumptions .................................................................................................................... 25
  Delimitations .................................................................................................................... 26
  Summary ........................................................................................................................... 26

Chapter 2  Review of the Literature ...................................................................................... 28
  Introduction ....................................................................................................................... 28
  Theoretical Framework .................................................................................................. 30
    Background .................................................................................................................. 30
    Theoretical Support .................................................................................................... 33
    Empirical Support ........................................................................................................ 34
  Coronary Artery Bypass Grafting .................................................................................... 34
    Theoretical Literature ............................................................................................... 34
    Empirical Literature .................................................................................................. 36
  Quality Health Care ........................................................................................................ 38
    Theoretical Literature ............................................................................................... 38
    Empirical Literature .................................................................................................. 40
  Outcomes ........................................................................................................................ 46
    Theoretical Literature ............................................................................................... 46
Chapter 3  Methodology ................................................................. 90

Research Design ............................................................................. 91
Setting ............................................................................................ 94
Sample ................................................................................................ 98
  Sample Selection ........................................................................... 98
  Sample Size .................................................................................. 99
Institutional Review Board ............................................................. 100
Enrollment ....................................................................................... 101
Data Collection Procedures .......................................................... 102
Outcome Measures ......................................................................... 105
Instruments ..................................................................................... 106
  Hospital Instrument ...................................................................... 108
  Nurse Practitioner Instrument .................................................... 108
  Chart Review Instrument ............................................................. 109
  Health Related Quality of Life Instrument .................................. 111
  Patient Satisfaction Instrument ................................................... 115
Data Analysis .................................................................................. 119
  Missing Data ................................................................................ 121
  Unit of Analysis .......................................................................... 122
  Descriptive Statistics .................................................................. 122
  Inferential Statistics ..................................................................... 127
Research Questions .......................................................................... 130
Secondary Data Analysis ............................................................... 131
Summary ......................................................................................... 131

Chapter 4  Data Analysis ............................................................... 133

Description of Hospitals ............................................................... 133
Nurse Practitioners ......................................................................... 135
Participant Sample Description ..................................................... 138
Primary Analysis ............................................................................ 141
  Research Question 1 .................................................................... 141
  Research Question 2 .................................................................... 143
  Research Question 3 .................................................................... 144
  Research Question 4 .................................................................... 144
Secondary Analysis ......................................................................... 145
Chapter 5 Discussion of Findings ................................................................. 157

Research Question 1 ................................................................. 158
Research Question 2 ................................................................. 163
Research Question 3 ................................................................. 168
Research Question 4 ................................................................. 175
Conclusions .................................................................................. 176
Limitations .................................................................................. 176
Implications ............................................................................... 177
Recommendations ....................................................................... 180
Chapter Summary ....................................................................... 182
References .................................................................................. 183

Appendix A Health Related Quality of Life Survey ................................. 209
Appendix B Satisfaction Survey The Patient Judgment System ................ 215
Appendix C Chart Review Tool .......................................................... 220
Appendix D Nurse Practitioner Survey ............................................... 222
Appendix E Hospital Instrument .......................................................... 225
Appendix F Institutional Review Board Approval Letter ............................ 226
Appendix G Patient Enrollment Verbal Script ....................................... 228
Appendix H Patient Screening Questions .............................................. 229
Appendix I Participant Consent .......................................................... 230
Appendix J Administrator Consent ...................................................... 234
Appendix K Nurse Practitioner Consent ............................................... 236
Appendix L Permission Letters................................................................. 238
Appendix M Licensing Agreement QualityMetric ........................................ 242
LIST OF FIGURES

Figure 1-1: Structure – Process – Outcomes Model .................................................. 12
Figure 1-2: The Outcomes Model for Health Care Research ...................................... 13
Figure 1-3: The Quality Health Outcomes Model ....................................................... 15
Figure 2-1: The Quality Health Outcomes Model ....................................................... 32
Figure 4-1: Histogram Health Related Quality of Life Physical Component
            Summary Scores .................................................................................................. 142
Figure 4-2: Histogram Health Related Quality of Life Mental Health Component
            Summary Scores .................................................................................................. 143
LIST OF TABLES

Table 1-1: Study Concepts, Operational Definition, and Tools for each Measure. .... 20

Table 2-1: Summary of Research of Patient Outcomes Related to Nurse Practitioners in Acute Care. ................................................................. 55

Table 3-1: Summary of Variables, Instruments, and Timing of Data Collection. ...... 107

Table 3-2: Descriptive Statistics Plan for Variables........................................... 120

Table 3-3: Descriptive Statistics for Participants’ Variable Age. ......................... 123

Table 3-4: Participant Descriptive Statistics for Gender, Hospital, Surgical Priority, and Diabetes. .............................................................. 123

Table 3-5: Descriptive Statistics for Outcomes Adverse Events, Mortality, and Re-admission. ........................................................................ 124

Table 3-6: Descriptive Statistics for Perceptions of Satisfaction......................... 125

Table 3-7: Descriptive Statistics for Perceptions of Health Related Quality of Life. . 126

Table 4-1: Number of Times Activities Performed by Nurse Practitioners Weekly. . 138

Table 4-2: Correlation Table of Hospital Readmission and Individual Adverse Events......................................................................................... 146

Table 4-3: Correlations of Health Related Quality of Life Items........................ 150

Table 4-4: Correlations of Patient Satisfaction Items......................................... 151

Table 4-5: Summary of Multiple Regression Predicting Health Related Quality of Life Physical Function. ......................................................... 153

Table 4-6: Summary of Multiple Regression Predicting Health Related Quality of Life Mental Health.................................................................. 154

Table 4-7: Summary of Multiple Regression Predicting Health Related Quality of Life Bodily Pain. ................................................................. 155
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Chapter 1

Introduction

Background

The issue of quality health care for patients in the United States (U.S.) has been a major concern to government officials and health care providers (Adams & Corrigan, 2003; Department of Health and Human Services [DHHS] Hospital Quality, December, 2005; About, n.d.; Kohn, Corrigan, & Donaldson, 2000; McGlynn, et al., 2003; New Advances in Patient Safety, 2005; Pennsylvania Health Care Cost Containment Council [PHC4] About, n.d.). Quality health care has been defined as the “degree to which health services for individuals and populations increase the likelihood of desired health outcomes and are consistent with current professional knowledge” (Kohn, et al., 2000, p. 211). Patients, as recipients of care, are exposed to a variety of factors that influence the quality of health care received in all areas where care is provided. These factors are multi-faceted and include patient acuity and co-morbidities, patient volume, and qualifications of health care providers (Adams & Corrigan; Kohn, et al.; New Advances in Patient Safety). The increased acuity of patients in hospital settings also impacts quality of care and service delivery patterns. Patients often have chronic illnesses, with multiple co-morbidities that result in a more complex patient, with complex needs (Institute of Medicine [IOM], 2001).

The Institute of Medicine’s landmark report To Err Is Human: Building a Safer Health System (Kohn, et al., 2000) and subsequent reports (IOM, 2001) was a response to changes in the health care system and placed an emphasis on improving the quality of
health care in the United States (US). The IOM’s initial report noted that up to 98,000 people die annually in hospitals from preventable adverse events, with patients in some hospital units at special risk (Kohn, et al., 2000). More recently, Zhan and Miller (2003) estimated more than 32,000 deaths in the U.S. annually related to patient safety, while the HealthGrades Quality Study of Patient Safety in American Hospitals (2004) identified 323,993 patient deaths related to patient safety indicators over a three year period. The IOM evaluated the quality of health care in the U.S. and made recommendations for change. Focus was placed on several priorities to improve health care in the US. One focus of the initial report was an identified need to use appropriate personnel and services in all aspects of health care (Kohn, et al., 2000). Nursing professionals also responded to these recommendations through the Tri-Council for Nursing by developing a position statement about patient safety (American Association of Colleges of Nursing [AACN], 2000). The Tri-Council for Nursing is a group of nursing organizations which includes the American Association of Colleges of Nursing (AACN), American Nurses Association (ANA), American Organization of Nurse Executives (AONE), and the National League for Nursing (NLN). The Tri-Council recommended a system of data collection focused on safety and outcomes, noting the importance of ensuring competence of all practitioners (AACN).

The IOM’s 2001 report identified six aims for improvement of the health care system with one of the core needs identified as providing patient-centered care, based on patient preferences. The IOM’s more recent report, Priority Areas for National Action: Transforming Health Care Quality (Adams & Corrigan, 2003), identified twenty priorities for quality improvement in health care. Selected priority areas include those
associated with high frequency, high cost, chronic conditions. One priority area listed is the provision of activities needed to prevent, treat, or reduce recurring events for in-patient surgical care for ischemic heart disease. These activities may include the provision of appropriate direct care and care coordination (Adams & Corrigan, 2003).

Health planners are concerned with the delivery of quality, cost-effective medical care. These concerns have led some to look to NPs to fill the void in non-traditional practice settings (Buerhaus, 1998; Jensen & Scherr, 2004; Kleinpell, 1999, 2005; Miller, Snyder, & Lindeke, 2005; Nurse Practitioners, 1998; Olson & Chioffi, 2005; Pew Health Professional, 1994; Shah, Brutomesso, Sullivan, & Lattanzio, 1997).

One frequently occurring health problem and the number one cause of death in the U.S. is heart disease (American Heart Association [AHA], 2007; Department of Health and Human Services [DHHS], June 2005; Minimo, Heron, Murphy, & Kochanek, 2007). One prevalent form of heart disease is ischemic disease, which has several forms of treatment. One of the treatments for ischemic heart disease is coronary artery bypass grafting (CABG). CABG is a surgical procedure that involves creating an alternate path (bypass) for blood to flow to the heart muscle (Cardiac Surgery, 2007; Eagle, et al., 1999; Eagle, et al., 2004). This form of treatment is for patients with severe blockages of the coronary arteries when other methods cannot be used (Eagle, et al., 1999; Eagle, et al., 2004; Cardiac Surgery, 2007). There are an estimated 450,000 CABG procedures performed in the U.S. in the year 2006 (AHA, 2009) with 11,022 CABG procedures performed in Pennsylvania (PA) hospitals in 2006 (Cardiac Surgery, 2008) with an average charge of over $92,000 per procedure in the U.S. (AHA, 2005) and $128,725 per
procedure in PA (Cardiac Surgery, 2008). Heart disease is considered one of the five most expensive conditions in the U.S. (Russo & Andrews, 2006).

Patients who are hospitalized for CABG surgery often receive care from advanced practice nurses (APN). APNs are registered nurses (RNs) who obtain additional specialized education in a chosen role. APNs include certified registered nurse anesthetists (CRNA), certified nurse midwives (CNM), clinical nurse specialists (CNS), and nurse practitioners (NPs) (Keeling & Bigbee, 2005; Miller, et al., 2005). Nurses who enter NP programs may select from additional specialization, including family NPs (FNP), pediatric NPs (PNP), neo-natal NPs (NNP), adult NPs (ANP), geriatric NPs (GNP), acute care nurse practitioners (ACNP), psychiatric NP’s, and women’s health NPs (Keeling & Bigbee). The NPs included in this study may be FNPs, ACNPs, or ANPs.

Historically, the specialties of the APNs were identified as early as the mid-nineteenth century (Keeling & Bigbee, 2005). NP practice evolved from primary care services provided by nurses in the community (Keeling & Bigbee). Additional NP specialties were developed to educate practitioners who would provide primary care services to specific populations such as families, adults, women, and the elderly in primary care areas. NP education initially took place in certificate programs, but now occurs at the master’s level. This educational change reflects requirement changes in 1998, when a graduate degree became a requirement for national certification (American Nurses Credentialing Center [ANCC], n.d.; Anderson, 2005). The state of Pennsylvania requires a master’s or post-master’s degree and national certification for state licensure (Pennsylvania Code, 2006).
NPs currently provide care to patients in acute care settings due to the increased acuity of patients, cutbacks in medical residency programs, and changes in the delivery of care for acute and critical care patients in hospitals (Anderson, 1997; Daly & Gent, 1997; Hravnak, Kleinpell, Magdic, & Guttendorf, 2005; Ingersoll, 1995; Keane, Richmond, & Kaiser, 1994; Olson & Chioffi, 2005). FNPs and ANPs, who were traditionally educated to provide primary care services for underserved and rural populations, are now providing care for patients in hospitals (Keeling & Bigbee, 2005; Knaus, Felten, Fobes, & Davis, 1997; Lambling, Adams, Fox, & Divine, 2004; Swartz, et al., 2003; U.S. Congress Office of Technology [OTA], 1986). Tertiary care is highly specialized care often performed by specialists in acute care or rehabilitation facilities (Webster’s New World). While the education of ACNPs was focused for these providers to care for patients in hospital settings, recent research indicates that 24% of ACNPs are employed by physician groups, while 7% work in clinics or health maintenance organizations (HMO) (Kleinpell, 2005).

NP practice sites continue to evolve and now include the care of acutely ill patients in tertiary care areas (Keeling & Bigbee, 2005; Kleinpell, 2005; Knaus, et al., 1997; Swartz, et al., 2003; U.S. Congress OTA, 1986). FNPs, ANPs, and ACNPs can all be found practicing in hospitals (Kleinpell, 2005; Knaus, et al.; Lambing, et al., 2004; Miller, et al., 2005; Swartz, et al.; U.S. Congress OTA). The patients in this research received care from NPs who were educated to provide care to adult patients, which may include FNPs, ANPs, and ACNPs. These three types of NPs who now practice in hospitals will be included in the generic term “NP,” which will be used for the remainder of the study.
Research measuring outcomes for patients who received care from NPs in acute care settings for adult patients was initially studied in hospital emergency departments (ED) and out-patient clinics with research about role, efficiency, productivity, and cost effectiveness providing the focus for the studies (Blunt, 1998; Knaus, et al., 1997; Mills & McSweeney, 2005; Sakr, et al., 1999; Sakr, et al., 2003).

Initial criticisms of research investigating the outcomes for patients who were cared for by NPs in their traditional primary care settings noted the lack of methodological rigor, small sample size, lack of theoretical frameworks, and potential bias from researchers who were NPs (Oermann & Floyd, 2002). Researchers have looked at the outcomes for patients who receive care from NPs in acute care areas (Counsell & Gilbert, 1999; Cowan, et al., 2006; Dahl & Penque, 2001; Dahle, Smith, Ingersoll, & Wilson, 1998; Ettner, et al., 2006; Hoffman, Tasota, Zullo, Scharfenber, & Donahoe, 2005; Jensen & Scherr, 2004; Knaus, et al., 1997; Lambling, et al., 2004; Miers, 2002; Ritz, et al., 2000; Sarkissian & Wennberg, 1999; Sidani, et al., 2006). More recently, patient outcomes have been evaluated for patient support after discharge from the hospital (Carroll, Robinson, Buselli, Berry, & Rankin, 2001; Carroll, Rankin, & Cooper, 2007; Tranmer & Parry, 2004). However, the criticism of the research evaluating the NP care in tertiary care settings continues (Kleinpell & Gawlinski, 2005; Miller, et al., 2005). Recent critique highlighted the need to re-examine the role of the NP working in acute care (Miller, et al., 2005) and the need to evaluate the ability of NPs to deliver cost effective, quality care in clinical settings (Kleinpell & Gawlinski; Miller, et al.; Oermann & Floyd 2002). Miller, et al. stated that few studies have examined the “added ingredient NPs bring to the care setting…. proposing that perhaps the positive outcomes related to
patient satisfaction and patient teaching are a result of the NPs nursing coming to the fore” (2005, p. 167). Research that describes patients who receive care from NP providers and outcomes and those patient outcomes is still needed.

NPs are commonly found in hospitals; however, the research on patient outcomes for patients provided by these practitioners is currently limited. This study adds new knowledge about patients perceptions and outcomes of care when care is provided to individuals who are hospitalized for a common, high cost condition; CABG surgery. The role of the NP in the care of this population is also reported. The Quality Health Outcomes Model (QHOM) is used as the theoretical framework for the study (Mitchell, Ferketich, & Jennings, 1998).

**Statement of the Problem**

Quality health care requires that delivery of care should be patient-focused with the use of appropriate personnel and resources in all settings where patients receive care. Patients in acute care often have multiple interacting clinical conditions and exposure to a variety of types of providers that may affect their outcomes and perceptions about quality. This requirement pointed to the need to describe patient perceptions of quality care in individuals who are hospitalized for frequently occurring conditions who may receive care from a different type of provider; the NP. The outcomes for patients hospitalized with high frequency, high risk, or high cost conditions should also be described. This becomes even more important as new or different providers are part of the process of care. Patients in hospitals with high risk, high cost conditions such as
CABG surgery are now receiving care from NPs. To date, there is little scientific evidence describing perceptions of quality or outcomes for patients in acute care settings for patients who had CABG surgery. This research was performed to describe the perceptions of patients related to quality of life and satisfaction when care was provided by NPs. A second reason for performing this study was to describe outcomes of care for patients in hospitals when an NP was used in the system of care. Additionally, the role of the NP for patients who have CABG surgery and the process of care will be described.

**Study Aims**

The primary aim of this study was to: 1) describe perceptions of patients related to quality of life and satisfaction post CABG surgery when NPs were an active part of the system of care. Secondary aims were to: 2) describe outcomes for patients post CABG surgery when an NP was an active participant in the system of care and 3) describe the role of the NP in the care of patients with CABG. Patient perceptions reflect aspects of quality from the view of the recipient of care. Perceptions about health related quality of life (HRQOL) and patient satisfaction may be considered outcomes of care. Outcomes were considered a measure of quality health care. Outcomes were measured as the occurrence of adverse events, cost of care, mortality, and hospital re-admissions within 30 days of discharge. NPs are considered unique members of the health care team who were one type of provider for patients hospitalized for CABG surgery.
Theoretical Framework

The QHOM (Figure 1.3) provides the framework for this investigation (Mitchell, et al., 1998). This model provided the guide for the selection of variables in this study related to the patient, NP, and outcomes. The QHOM was developed by Mitchell, Ferketich, and Jennings (1998), as members of the American Academy of Nursing Expert Panel on Quality Health Care, to serve as a guide for research related to quality improvement and quality outcomes management. The QHOM is an extension of the work on quality of care by Donabedian (1966, 1988) and Holzemer (1994). General Systems Theory (GST) provided the background for the development of Donabedian’s Quality of Medical Care Model (Structure, Process, Outcome Model). GST, Donabedian’s, and Holzemer’s models will be introduced to describe the evolution from GST to the QHOM.

General Systems Theory (GST) (von Bertalanffy, 1966) is the foundation used for the development of many theoretical models in disciplines that deal with human beings, including nursing, and organizational theory (Clements, 1983; Goodman, 1982; von Bertalanffy, 1966). GST made a highly significant contribution to the understanding of “systems” by changing the way scientists viewed the world; moving from a reductionist perspective to an organismic perspective (McKay, 1997). It was originally developed as a model for looking at organisms as systems, with processes of mutual interactions. It has evolved as a method of looking at organ systems, body systems, individuals, families, communities, and organizations (Clements, von Bertalanffy).

Systems theory is a science of the structure of “wholeness” (von Bertalanffy, 1966). The theory is organized around the concepts wholeness, boundaries, and
hierarchies. Control of the system is achieved through homeostasis, feedback, and energy (Clements, 1982; von Bertalanffy). A system is parts working together to make up the whole. The whole is seen as different, and greater than, the sum of the parts. Changes in one part of the system results in changes in the whole. Systems have boundaries which serve to separate objects within the system from those things outside the system.

Boundaries are a mechanism for protection. Boundaries can be open or closed, and occurs on a continuum. Hierarchies refer to the relationship of systems in a hierarchy; subsystem, suprasysems (Clements, 1983; von Bertalanffy, 1966). Control of the system occurs through homeostasis, feedback, and energy. Homeostasis occurs as a self-regulatory process to maintain a constant state of exchange, energy, and information. Feedback occurs when the system has some stimulus (input), accepts or rejects the stimulus (coding), and transforms the stimulus as it moves through the system (throughput). This energy exchange is the “feedback scheme” (von Bertalanffy, 1966). Energy is taken into the system (food, water, heat, light) and used or stored. Stored energy is used when needed (Clements, 1983). These concepts provided the foundation for many theories that followed.

GST has been useful as a basis for other theories that study health care effectiveness. Health care occurs in organizations or systems of care. GST has influenced other models ability to describe and explain the complexity of the health care systems. Health care systems can be viewed as a whole, consisting of subsystems or parts (departments or individual workers) and suprasystems (the community). Each of the sub or supra systems influence the whole. A change in one part of the system results in a change in the whole. There are boundaries, hierarchies, and control of the system. The
study of effectiveness outcomes is often influenced by many components of the system. One of the outputs of the system could be viewed as effectiveness outcomes. This view of health care systems allows one to identify the complex nature and interactions of the system. It is easy to identify how GST influenced organizational theory, nursing theory, and theories of other disciplines by looking at the system as a whole and identifying system functions. Input is the time or energy used to change the system; such as the NP or patient in this study. The system can accept or reject the input by coding. Throughputs are the processes used by the system to convert the energy; such as NP role and care activities in this study. Outputs occur as a result of the input and throughput and are the results of care in this study; perceptions of health related quality of life and satisfaction, adverse events, cost, mortality, and re-admission.

Donabedian (1966) originated the Structure-Process-Outcomes Model of quality using empirical evidence to describe the components necessary for quality medical care to occur. Outcomes of care were evaluated for their validity in representing quality. Suggested original outcomes included recovery, restoration of function, survival rates, patient satisfaction, and social restoration (Donabedian, 1966, p. 167). Donabedian further explained and defined the components of quality in 1988. Structure of care was described as the “attributes of the setting in which care occurs” (Donabedian, 1988, p. 1745). Structure of care includes material and the organization’s resources. This includes material resources (e.g., equipment, buildings, money) and human resources (i.e., number of qualified personnel) and organizational structure (e.g., methods of peer review). Processes of care were described as “what is actually done in giving and receiving care” (Donabedian, 1988, p. 1745). Processes of care include the patient and practitioner
activities in the process of giving and receiving care. Outcomes of care are the “effects of care on the health status of patients and populations” (Donabedian, 1988, p.1745). Donabedian discussed the relationship between structure and process that result in outcomes. This relationship can be graphically depicted as a linear model with no feedback between the concepts (Figure 1). Donabedian’s model has been considered the gold standard for evaluating quality of health care since the 1960s, and it is the basis for development of several models of quality in health care (Byers & Brunell, 1998; Holzemer, 1994, 1997; Holzemer & Reilly, 1995; Irvine, Sidani, & Hall, 1998; Mitchell, et al, 1998; Sidani & Irvine, 1999).

![Figure 1.1. Structure – Process - Outcomes Model (Donabedian, 1966)]

Holzemer’s Primary Care Model (1994) extended the work of Donabedian by adding a vertical dimension to Donabedian’s concepts of structure, process, and outcome. The vertical dimension of the model added the concepts client, provider, and setting (Figure 1.2). This model evaluates client from the impact of processes of care and processes of the client. There are no reciprocal relationships between the concepts of this model.
Developers of the QHOM used Donabedian’s traditional framework and added the dimensions of Holzemer’s model to create a dynamic and complex model with reciprocal relationships between the identified concepts system, intervention, client, and outcomes (Figure 1.3). The QHOM depicts the relationship between interventions and outcomes as mediated and moderated by system and client characteristics.

The QHOM incorporated Donabedian’s concepts structure and process elements into the system component of the model. System components can include hospital size, skill mix, technology, and client demographics (Mitchell, et al., 1998). The NP was considered incorporated in the concept system of this model. Interventions were the direct and indirect clinical processes used to deliver care (Mitchell, et al.). Client was defined as the individual, family, or community who received an intervention and can include elements of client health, demographic information, and risk factors for disease (Mitchell, et al.). Outcomes are measures that result from care structures and processes.
Outcomes can include functional, social, psychological, physical, and physiologic measures of care (Mitchell, et al.).

The selected variables of this study were congruent with the QHOM. The patient variable is a component of “client.” Patient demographics and risk factors for disease are included in the client variable of the model. Outcomes are a component of “outcomes” in the model. Outcomes included adverse events, mortality, cost of care, hospital re-admissions, patient perceptions of satisfaction, and patient perceptions of health related quality of life. The NP provider is considered in the “system” and “process” of care of the QHOM.

Propositions

The conceptual framework represented the complexity of interactions between system, interventions, client, and outcomes that result in quality outcomes in health care. The specific propositions of the model are the following:

1. Effects of interventions operate through mediating or moderating components of the system and/or the client (P. Mitchell, personal communication, July 30, 2005).

2. “Interventions affect outcomes indirectly through patient and health care system characteristics” (Radwin, 2002).

3. The relationships among interventions, patient and system characteristics, and outcomes are reciprocal (Radwin, 2002).
*System (**Input)

*Hospital, NP, Providers

Individual Group Organization

*Intervention (**Throughput)

*Role of NP, HRQOL, Processes of Care

Individual Group Community

*Outcomes (**Output)

*Perceptions of Satisfaction, Adverse events, Cost, Mortality, Re-admission

*Client (Patient) (**Input)

*Patient, Co-morbidity, Surgical Priority

*Indicates the selected variables to be included in this research. ** Indicates System Theory Component.
Summary of the model

The QHOM provided the theoretical framework for the research. This model represents the complexity of interactions that impact health outcomes in the acute care setting. Individuals are the client considered in the model. This framework guided the selection of appropriate variables and the measures for perceptions of HRQOL, perceptions of satisfaction, and the outcomes adverse events, cost, mortality, and re-admissions for patients who had CABG surgery.

Research Questions

Little is known about perceptions of HRQOL and satisfaction, and the outcomes adverse events, cost, mortality, and hospital re-admission for patients who have CABG surgery when NPs are actively involved in patient care. The population studied was patients hospitalized for CABG surgery who received care from an NP in addition to standard medical care. The primary research questions addressed in this study were:

Question 1: What are the perceptions of health related quality of life for patients who had CABG surgery when NPs were actively involved in care?

Question 2: What are the perceptions of satisfaction for patients who had CABG surgery when NPs were actively involved in care?

Secondary questions addressed in this study were:

Question 3: What is the occurrence of adverse events, cost, mortality, and re-admissions for patients post CABG surgery when NPs were actively involved in care?

Question 4: What is the role of the NP for patients who have CABG surgery?
Definitions

The main constructs of this research were quality of care and effectiveness of care, measured as patient perceptions of health related quality of life, perceptions of patient satisfaction, and outcomes. The outcomes that were measured were the occurrence of adverse events, cost of care, mortality, and hospital re-admissions. The conceptual and operational definitions of each of these terms will be given. A summary of study concepts, operational definitions, and tools for each measure are provided in Table 1.1.

Quality of health care

Conceptual definition

Quality of health care was defined as the “degree to which health services for individuals and populations increase the likelihood of desired health outcomes and are consistent with current professional knowledge” (IOM, 2000, p. 211).

Operational definition

Quality of health care was operationally defined as outcomes of care (Clancy & Eisenberg, 1998; Guadagnoli & McNeil, 1994). The outcomes measured included occurrence of adverse events, cost of care, HRQOL, mortality, and patient satisfaction.

Effectiveness

Conceptual definition
Effectiveness was defined as a profile of specific outcomes of care that occur as a result of everyday practice conditions (Donabedian, 1990; Guadagnoli, & McNeil, 1994; Petitti, 1998, p. 249).

*Operational definition*

Effectiveness was operationally defined as specific measurable outcomes of care (Guadagnoli, & McNeil; Petitti, p. 249). For this study, outcomes of care were measured as adverse events, cost of care, mortality, and hospital re-admissions.

**Perceived Health Related Quality of Life**

*Conceptual definition*

Health related quality of life (HRQOL) was considered a general measure of health which included the domains of physical, social, emotional, cognitive function, pain, vitality, and overall well-being (Maciejewski, 1997). HRQOL was the “dimensions of health and well-being that encompass consequences for the daily lives of individual patients” (Clancy & Eisenberg, 1998, p. 245).

*Operational definition*

Perceived health related quality of life (HRQOL) was operationally defined as scores for eight domains of health and the two summary scores for physical and mental health on the SF-36v2 Health Survey (QualityMetric, n.d.) (Appendix A). This information was obtained from the SF-36v2 survey tool.
Perceived Patient Satisfaction

*Conceptual definition*

Perceived patient satisfaction was defined as a “patient’s emotional or cognitive evaluation of a health care provider’s performance” (Maciejewski, Kawiecki, & Rockwood, 1997, p. 69).

*Operational definition*

Perceived patient satisfaction was operationally defined as the results on the Patient Judgment System-20 (PJS-20) survey (Appendix B) (Hays, Larson, Nelson, & Batalden, 1991).

Outcomes

*Conceptual definition*

Outcomes were end results that occur in the health status of an individual or group that can be attributed to an intervention or treatment (Clancy & Eisenberg, 1998, p. 245; Petitti, 1998, p. 249). Outcomes measures were the results of structure and processes of care. Outcomes can integrate functional, social, psychological, physical, and physiologic aspects of people experience with care (Mitchell, et al., 1998).

*Operational definition*

Outcomes may include mortality, clinical measures, dimensions of health and well-being, and patient satisfaction (Clancy & Eisenberg, 1998; Guadagnoli & McNeil, 1994). Outcomes were operationally defined as the adverse events: respiratory, urinary
tract or wound infections; cost of care; mortality; and hospital re-admissions. These outcomes were measured using the Chart Review Tool (Appendix C).

Nurse Practitioner

*Conceptual definition*

Nurse Practitioner was defined as an advanced practice nurse with education, skills, and responsibilities beyond the registered nurse (RN) needed to provide care to persons with common or complex health needs (Hamrick, 2005).

*Operational definition*

Nurse Practitioner was operationally defined as a registered nurse who is licensed as a Certified Registered Nurse Practitioner (CRNP) in the state of Pennsylvania (Pennsylvania Code, 2006). The role of the nurse practitioner was identified on the Nurse Practitioner Survey Tool (Appendix D).

*Table 1. Study Concepts, Operation Definition, and Tools for each Measure*

<table>
<thead>
<tr>
<th>Concept</th>
<th>Operational definition</th>
<th>Tool</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nurse Practitioner</td>
<td>An RN licensed as a CRNP in the state of Pennsylvania</td>
<td>Nurse Practitioner Survey Tool</td>
</tr>
<tr>
<td>Adverse events</td>
<td>Re-admission within 30 days of hospital discharge</td>
<td>Chart Review Tool</td>
</tr>
<tr>
<td></td>
<td>Occurrence of pulmonary infection</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Occurrence of urinary tract</td>
<td></td>
</tr>
<tr>
<td>Category</td>
<td>Description</td>
<td>Tool/Source</td>
</tr>
<tr>
<td>---------------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Infection</td>
<td>Occurrence of wound infection</td>
<td></td>
</tr>
<tr>
<td>Cost of care</td>
<td>Total amount the hospital bills for the care of each patient</td>
<td>Chart Review Tool</td>
</tr>
<tr>
<td>Health related quality of life</td>
<td>Scores for 8 sub-scales: physical functioning, role limitations due to physical, bodily pain, general health perceptions, vitality, social functioning, role limitations due to emotional, and mental health</td>
<td>SF-36v2 (QualityMetric, n.d.)</td>
</tr>
<tr>
<td>Mortality</td>
<td>Occurrence of death during the hospitalization for the CABG surgery</td>
<td>Chart Review Tool</td>
</tr>
</tbody>
</table>
Significance

The issue of quality health care has gained a renewed interest from consumers and providers since it was first discussed in the early 1900s (About, n.d.; Adams & Corrigan, 2003; IOM, 2001; Kohn, et al., 2000). The recent interest in health care quality resulted from an evolution of the health care system into a complex high cost system with great potential for error (Adams & Corrigan; IOM; Kohn, et al.). Patients receive health care for conditions in a variety of settings (primary care, long-term care, acute care), using multiple providers (MDs, NPs, etc.). The IOM’s report *To Err Is Human: Building a Safer Health System* (Kohn, et al.) highlighted the weaknesses of the health care system and focused national attention on identification of goals in order to improve quality. 

Priority areas of health care were addressed in the IOM’s 2001 and 2003 (Adams & Corrigan) reports which discussed providing appropriate client centered care by identifying client preference and needs for patients who experience high incidence conditions. Specified in the IOM’s 2003 report was the surgical care for individuals with ischemic heart disease. Coordination of care and use of appropriate personnel was one suggested method to improve the care of this population (Adams & Corrigan).

Patients receive care from NPs in acute care settings. The last ten years brought significant change to the NP profession. NPs are a group of providers whose role was formally introduced in 1965 as a means to introduce an advanced practice nurse educated to provide primary care services for underserved populations (Ford, 1997a; 1997b). Changes in health care and shortages of providers in acute care resulted in the
development of a new NP role, the ACNP, who practiced in acute care settings (Hravnak, et al., 2005). During this time, other NPs, FNPs, and ANPs practice sites shifted into hospitals settings (Kleinpell, 2005). When patients experience high frequency, high cost surgical conditions such as CABG surgery (American Heart Association, 2009; Cardiac Surgery, 2008) and are exposed to new health care providers, perceptions of quality and the occurrence of outcomes need to be evaluated.

**Practice**

NPs provide care to patients in all types of health care settings. Practice sites of NPs have evolved since the inception of the role in the 1960s. Critics of the NP role raised concerns that NPs are used as a cheaper replacement for medical staff (Marsden, 1995). This criticism may lead consumers of health care to believe that the quality of care for patients who receive care from NPs is lacking, which may in turn affect clinical practice. Given this criticism, patient perceptions and outcomes for patients who receive NP care needs to be examined for all clinical conditions in sites where NPs practice. Clinically relevant outcomes that demonstrate the value of NPs also need to be identified (Kleinpell, & Gawlinski, 2005; Nies, et al., 1999; O’Connell & Warelow, 2001; Oermann & Floyd, 2002).
**Education**

The renewed focus on quality health care and the need to demonstrate effectiveness of all types of providers resulted in an impetus for change in the education of NPs. One competency for all health care providers for the twenty-first century recommended by the Pew Health Professions Commission was the responsibility for quality care and health outcomes (O’Neil, 1998). NP educators were urged to re-orient educational programs to prepare NPs for acute care settings (Bellack & O’Neil, 2000). Brooten, Youngblut, Deatrick, Naylor, and York noted that APNs need skills “developed in assessing, teaching … and having condition-specific knowledge about different patient problems” (2003, p. 73). This research will assist to describe patient perceptions and outcomes of care for patients who received care from NPs. Client centered care, with a focus on patient preferences needs to be considered in the education of NPs.

**Research**

This study can contribute to nursing science in several ways. The use of a conceptual model to guide the research can help to advance nursing knowledge and identify additional research and hypotheses (Meleis, 1997). Nursing theory serves as a guide for the selection of variables and interpretation of the research findings (Babbie, 2004; Cresswell, 2003). Stone (1994) noted that much of the research about NPs was not conceptually based. The lack of a conceptual base for research about outcomes for patients cared for by NPs continues to limit studies (Sweeney, 2004).
Additionally, describing perceptions of patients related to health related quality of life and satisfaction post CABG surgery is an initial step to describe patient centered care in hospitals. The description of outcomes of patients after CABG surgery for patients who receive care from NP provides additional information about how NPs impact patient care in a particular clinical situation (CABG surgery) in a new practice setting. As new providers of care are introduced into health care settings, it is important to evaluate those providers in terms of their contribution to the quality of patient care. Ford (1997a) commented that NPs should conduct research related to patient outcomes in acute care. These studies would provide the evidence for the “efficacy, efficiency, economy, and patient-family satisfactions of the system of care” (Ford, 1997b, p.90).

Patients who are admitted to hospitals with an acute illness, who need high risk procedures often have many co-morbid conditions. These individuals are exposed to a complex health care system that includes different types of providers, including NPs. These factors may influence perceptions of care, as well as patient outcomes. Health care providers and acute care facilities need to understand how the care that is provided and how the providers themselves influence the quality experience of the patient. Research is currently needed to describe the preference of patients and their outcomes when care is provided by NPs.

Assumptions

The assumptions of this study were:

1. Quality of health care can be measured as outcomes in acute care facilities.
2. Perceptions of patients indicate one aspect of quality of care.

3. Nurse practitioners are a type of health care provider that may affect the outcomes of care in hospitals.

4. All patients undergoing CABG surgery receive the usual standardized nursing and medical care, in addition to the NP cares.

5. Instruments with established validity and reliability were used to assess outcomes.

6. Hospitals participating in the study had similar resources.

Delimitations

Participants were limited to the following:

1. Patients undergoing cardiac surgery for CABG procedure

2. Patients older than 18 years of age

3. Patients undergoing CABG surgery in mid-size community hospitals in northeastern, southeastern, or central Pennsylvania

Summary

The concept of quality health care has become a focus of policy makers and health care providers since the original quality report from the IOM in 2000 (Kohn, et al.). Subsequent reports focused national attention on patient safety issues and gaps in quality health care (IOM, 2001; Adams & Corrigan, 2003). Important foci of care are related to providing patient-centered care that is effective, identifying patient preferences,
and customizing care (IOM, 2001). These foci should be applied to patients with high frequency, high cost conditions, such as ischemic heart disease and patients having CABG surgery (Adams & Corrigan). Quality health care is influenced by the structure and processes that occur in health care institutions (Donabedian, 1966; Holzemer, 1994; Mitchell, et al., 1998). NPs are one group of providers who have demonstrated positive outcomes for patients in primary care and rural settings; however, there is not enough information about the outcomes for patients in acute care. This study describes the perceptions of patients post CABG surgery related to health related quality of life and patient satisfaction when care is provided by NPs. This study also describes the outcomes for patients with a high frequency, high cost specific condition; CABG surgery when care is provided by NPs.
Chapter 2

Review of the Literature

Introduction

The primary aim of this study was to describe what is currently known about patient perceptions of health related quality of life (HRQOL), perceptions of satisfaction, and outcomes of care for patients in acute care facilities when Nurse Practitioners (NP) were active participants in care. A secondary aim of this study was to describe the role of NPs who provided care to patients who had CABG surgery. The literature review was also performed to identify gaps that exist in the knowledge about outcome measures for patients in acute care facilities and how NPs implement the role in hospital settings. A second purpose of this literature review was to describe the Quality Health Outcomes Model (QHOM).

This literature review is divided into five main sections. The first section provides a discussion of the theoretical framework used in this study. The second section provides a general discussion about CABG surgery. The third section presents general background information related to quality of health care. The fourth section is specific to outcomes for patients who received NP care, measured in primary care and hospitals. The final section presents studies focused on NP roles. Sections three through five are further divided into theoretical and empirical literature.

A broad literature search was completed to minimize threats to validity (Cooper, 1989). The review of the literature is based on a several search strategies. The
computerized databases PubMed, Cumulative Index to Nursing and Allied Health (CINAHL), and Dissertation Abstracts were accessed. The keywords used for retrieval were quality, nurse practitioner, acute care, outcomes, CABG, cardiac surgery, and effectiveness. A basic field search key was initially used so that if any of these keywords appeared in the title or as the subject the citation was listed. Titles were scanned for appropriateness. Articles were initially reviewed for background information and appropriateness. An advanced search was then used to identify research articles. All accessed research articles were then reviewed for pertinence to this investigation.

The search performed in PubMed (1975-2008) revealed the following number of citations: effectiveness and nurse practitioner (n = 338); outcomes and nurse practitioner (n = 568); quality and nurse practitioner (n = 1,008); surgery and nurse practitioner (n = 473); cardiac surgery and nurse practitioner (n = 13). CINAHL (1975-2007) displayed the following citations: effectiveness and nurse practitioner (n = 1,974); outcomes and nurse practitioner (n = 2,182); quality and nurse practitioner (n = 3,037); surgery and nurse practitioner (n = 1,014); cardiac surgery and practitioner (n = 188). The keywords that produced results in Dissertation Abstracts were nurse practitioner and outcomes (n = 41); nurse practitioner and quality (n = 43); nurse practitioner and surgery (n = 4); and nurse practitioner and cardiac surgery (n = 3). All citations were reviewed for conceptual relevance and applicability to the proposed study. The reference list in all retrieved articles was also reviewed for additional relevant citations.
**Theoretical Framework: The Quality Health Outcomes Model**

**Background**

Mitchell, et al.’s (1998) QHOM provided the framework for this study. This model was developed by members of the American Academy of Nursing Expert Panel on Quality Health Care to serve as a guide for research related to quality improvement and quality outcomes management (Mitchell, et al., 1998). The QHOM, based on Donabedian’s Structure-Process-Outcomes Model (1966) and Holzemer’s Primary Care Model (1994), was “a synthesis of the authors’ experience in quality of care practice and research” (Mitchell, et al., p. 43).

The QHOM was introduced in 1998 by Mitchell, Ferketich, and Jennings and is based on the work of Donabedian and Holzemer. Mitchell, et al. proposed that the model relates the complexity of factors that affect quality and outcomes. It extended Donabedian and Holzemer’s work by “positing dynamic relationships with indicators that not only act upon, but reciprocally affect the various components” (Mitchell, et al. 1998, p. 1). The model also recognizes dynamic process that occurs among the main concepts.

The primary concepts of the model include system, interventions, client, and outcomes (Mitchell, et al., 1998). The path from intervention to outcomes is mediated and moderated by system and client characteristics. System and client can also be measured at the individual, group, or organization/community level (Mitchell & Lang, 2004).

System variables incorporate Donabedian’s structure and process elements. Mitchell, et al. (1998) includes the type of agency, provider type, client demographics,
technology, and provider skill mix in the system component of this model. Interventions are direct and indirect clinical process and the related activities by which interventions are delivered. Client characteristics include variations of client health, demographics, and disease risk factors. Outcomes in the model include traditionally measured outcomes (death, disease, disability, discomfort, dissatisfaction). Other suggested outcomes are achievement of appropriate self-care, demonstration of health-promoting behaviors, health-related quality of life, perception of being well-cared-for, and symptom management (Mitchell, et al., 1998; Mitchell & Lang, 2004). The model is depicted in Figure 1.3.

This model was selected to guide the study because it reflects the complexity of the health care system and the interactions that result in health care outcomes. The model served as a guide for the selection of variables and variable operationalization. The study focused on the client (patient) as the recipient of care. The NP was a specific type of provider, included in the system of care in the QHOM. NP processes of care were a component of intervention variable of the model. The outcomes measured included perceptions of HRQOL, perceptions of satisfaction, occurrence of adverse events, cost of care, mortality, and hospital re-admission.
*System (Input)

*Hospital, NP, Providers

*Intervention (Throughput)

*Role of NP, Processes of Care

*Outcomes

*Perceptions of HRQOL, Satisfaction, Adverse events, Cost, Mortality, Re-admission

*Client (Patient) (Input)

*Patient, Co-morbidity, Surgical Priority

*Individual

*Group

*Organization

*Community

Theoretical Support of the Model

The QHOM has been used as a framework for a national conference on the development of outcome measures, and has served as the conceptual basis for research. The QHOM was used to structure the 1996 conference “Outcomes Measures and Care Delivery Systems” (Mitchell, Heinrich, Moritz, & Hinshaw, 1997). The purpose of the conference was to identify and clarify outcomes in health care delivery, identify potential indications for measurement in health care delivery, and to develop research and policy recommendations for development of measures to be used in health care (Mitchell, et al., 1997). Kellogg (2003) and Miltner (2001) used the QHOM to guide their dissertation work. Miltner studied the relationship between the type and quantity of nursing care provided for patients in labor and the patient’s and hospital unit acuity level. Miltner used the QHOM to demonstrate the link between nursing care and patient outcomes in the laboring client. Kellogg’s research, titled “Testing an Innovative Method to Collect Adverse Events Data: A Methodological Study,” tested this new method to collect the occurrence of adverse events in hospitals.

Radwin and Fawcett (2002) used the QHOM to develop a coherent research program and identify gaps in nursing knowledge. Radwin and Fawcett retrospectively interpreted four previously conducted research studies using the QHOM and found that by using the QHOM they identified gaps in nursing knowledge associated with the studies.

Mayberry and Gennaro (2001) demonstrated use of the model to examine how interventions influence outcomes during the second stage of labor. The authors also
describe how the model can be used to identify more factors that further improve patient care in this setting. Mayberry and Gennaro suggested an extension of Mitchell’s model called the “Second Stage Labor Outcomes Model.”

**Empirical Support of the Model**


**Coronary Artery Bypass Grafting**

**Theoretical Literature**

Heart disease is the number one cause of death in the U.S. (Department of Health and Human Services [DHHS] Centers for Disease, 2005). One form of heart disease is ischemic disease, which has several forms of treatment including medications, balloon angioplasty, and CABG surgery (Eagle, et al., 1999; Eagle, et al., 2004). CABG is a surgical procedure used to treat patients with blockages in the coronary arteries. This form of treatment is used for patients with severe blockages of the coronary arteries when other methods cannot be used (Eagle, et al., 1999; Eagle, et al., 2004; Cardiac Surgery, 2008). These patients have common underlying disease and other co-morbidities. Co-morbidities associated with CABG include diabetes, hypertension, peripheral vascular
disease, and kidney disease (Eagle, et al., 1999; Eagle, et al., 2004; PHC4 Technical Notes, 2007). Patients are usually admitted to hospitals for an average of five to six days (Cardiac Surgery, 2007) for the CABG surgery. Hospitals that are licensed to perform CABG surgery are regulated by the Pennsylvania Department of Health (PA DOH). The PA DOH regulates the type of resources required by hospitals certified to perform CABG. The regulations for hospitals performing CABG include requirements on surgical facilities, the surgical team, medical staff, nursing staff, support personnel, post-operative care, monitoring of patients, and training and education of staff (PA DOH: Health Facility Licensure Regulations, n.d.).

The first attempt at CABG was performed as early as 1953, and the first successful CABG procedure was performed in 1964 (Eagle, et al., 1999). Since that time, CABG has become one of the most common surgical procedures performed in the U.S. (Eagle, et al., 1999). Initially, this surgery was reserved for the sickest of patients, given the high risk associated with the procedure. Improvements in surgical techniques, anesthesia, and other technologies have significantly decreased mortality and allowed more difficult patients to obtain the benefits of the procedure (Eagle et al., 1999). CABG surgery is now performed on more than 11,000 patients a year in PA (Cardiac Surgery, 2008).

The Pennsylvania Health Care Cost Containment Council (PHC4) is a state agency that collects state-wide data on CABG and other hospital procedures. A primary responsibility of this agency is to collect and analyze public data about the cost and quality of health care in PA (PHC4 About the Council, n.d.). CABG data has been collected since 1992. The original data included hospital and surgeon volume, cost per
procedure, and length of stay. Information is now collected on many variables, including patient age; gender; hospital charges; hospital, 7-day, and 30-day mortality rates; 7-day and 30-day re-admission rates; surgical length of stay; presence of patient co-morbidities such as diabetes, hypertension, obesity, and kidney disease; occurrence of surgical wound infections (Cardiac Surgery, 2008; PHC4 Technical Notes, 2007).

**Empirical Literature**

Research on CABG focused on outcomes and identification of patients at risk for morbidity and mortality. Initially in-hospital mortality was studied (Eagle et al., 1999; O’Connor, et al., 1991). The research that followed identified predictors of in-hospital mortality. The predictors of in-hospital mortality have been identified as increased age (Edwards, Grover, Shroyer, Schwartz, & Bero, 1997; Hannan & Burke, 1994; O’Connor, et al., 1991; PHC4 Coronary Artery, 2002); female gender (O’Connor et al., 1993); prior heart surgery (Edwards, et al. 1997; PHC4 Coronary Artery, 2002); poorer heart function (Jones, et al., 1996; O’Connor, et al., 1991; PHC4 Coronary Artery, 2002); the presence of diabetes, hypertension, or kidney disease (Smith, et al., 1991); and urgent or emergent surgery (Eagle, et al., 1999; PHC4 Coronary Artery, 2002; O’Connor et al., 1991; Rankin, 1990). Jones, et al. (1996) identified seven core variables associated with in-hospital mortality. These variables included urgency of surgery, age, prior heart surgery, gender, heart function, percent narrowing of the main coronary artery, and the number of major arteries with more than 70% stenosis. Other outcomes that have been studied include morbidity, adverse cerebral outcomes, sternal surgical wound infections, and
renal dysfunction (Eagle et al., 1999). The most recent outcomes focused on re-admission rates and occurrence of hospital acquired infections (Cardiac surgery, 2007; PHC4 Technical notes, 2007).

Mortality rates for patients undergoing CABG are variable and are associated with several risk factors, ranging from less than 1% to 5% (Eagle, et al., 1999; Cardiac Surgery, 2007). The most recent statistics available for the state of PA indicate that the in-hospital mortality for patients having CABG during the year 2005 was 1.8% (Cardiac Surgery, 2008). Predictors of hospital mortality include gender, age, presence of co-morbidities, and heart function. Jones, et al. (1996) analyzed seven datasets on over 172,000 patients who had CABG and found that age was predictive of mortality after CABG. Tu, Sykora, and Naylor (1997) found that advancing age also increased patient risk, with patients over the age of 75 having the greatest risk.

Summary

CABG surgery is a high-frequency, high-cost procedure associated with heart disease (American Heart Association, 2007; Cardiac Surgery, 2008). Risk factors that increase the likelihood of death or disability have been identified (Edwards, et al., 1997; Hannan & Burke, 1994; Jones et al., 1996; O’Connor, et al., 1991; O’Connor, et al., 1993; PHC4 Technical Notes, 2007; Smith, et al., 1991; Tu, et al., 1997). Patients with heart disease are often admitted to hospitals in order to receive various forms of treatment. It is important to evaluate how health care providers affect outcomes for commonly occurring diseases and their treatments.
Theoretical Literature: Quality of Health Care

The concept of quality health care has been identified and explored in medicine and nursing since the time of Florence Nightengale (Lang & Marek, 1990). During the Crimean War, Nightengale investigated quality health care, recording and analyzing health care conditions and outcomes (Lang & Marek). Nursing continued to recognize the need to evaluate quality care when Aydelotte (1962) published one of the first studies that evaluated outcomes in patients resulting from nursing care. Donabedian (1966) discussed the need to evaluate quality health care in a systematic manner. The seven pillars of quality were identified as efficacy, effectiveness, efficiency, optimality, acceptability, legitimacy, and equity (Donabedian, 1990). A series of theories about quality evolved from this early work (Byers & Brunell, 1998; Donabedian, 1966; Holzemer, 1994, Mark, Sayler, & Smith, 1996; Mitchell, et al., 1998; Sidani & Irvine, 1999). More recently the Institute of Medicine (IOM) defined quality as the “degree to which health services for individuals and populations increase the likelihood of desired health outcomes and are consistent with current professional knowledge” (IOM, 2000, p. 211).

A new perspective about quality has emerged when the IOM (2001) identified one of six aims to improved quality as the need to provide patient centered care that reflects individual preferences. National nursing associations also addressed the issue of quality care in the 1990s when the American Nurses Association (ANA) launched the Nursing’s Safety and Quality Initiative, which investigated the impact of health care restructuring on the safety and quality of patient care (ANA, 1995). The ANA published the Nursing
Care Report Card for Acute Care in 1995 identifying the need to achieve appropriate outcomes for patient in acute care facilities. The ANA identified patient outcomes considered to be sensitive to nursing care at that time. These outcomes included freedom from complications, functional health, knowledge, satisfaction, and cost of care (ANA, 1995).

Government agencies and individual states began to address the issue of quality health care as early as 1970 (About, n.d.; Department of Health and Human Services [DHHS] Hospital Quality Alliance Quality Measures, 2005). The Institute of Medicine (IOM) was chartered in 1970 as part of the National Academy of Science with the primary mission of improving the health of nation using current research to develop recommendations or guidelines (About, n.d.). A quality health care focus emerged from the IOM when the IOM published its landmark report *To Err Is Human: Building a Safer Health System* (Kohn, et al., 2000). Since that time the IOM produced numerous reports and recommendations to improve the health of our nation and the safety for patients in our health care system. The state of Pennsylvania recognized the need to monitor the quality of health care when it formed the PHC4 council in 1986 (PHC4 About the Council, n.d.). A main goal of the PHC4 was to provide information to health care providers that can be used to improve the quality of health care. Consumers also have access to PHC4 information that assists individuals or health plans to make informed choices about providers of care (PHC4 About the Council).

In 2001 the DHHS’s Center for Medicare and Medicaid Services announced the Quality Initiative with a goal to stimulate and support the quality of health care in nursing homes and hospitals (DHHS Hospital Quality Initiative, 2005). This initiative was
intended to provide consumers with information about the health care outcomes of institutions in order for them to make informed choices (DHHS Hospital Quality Initiative). The DHHS worked in conjunction with the Hospital Quality Alliance, a public-private collaboration to develop measures and reporting systems on hospital quality (DHHS Hospital Quality Initiative, DHHS Hospital Quality Alliance, 2005). One of the earliest hospital quality measures developed by the DHHS was for the care of patients with heart disease (DHHS Hospital Quality Measures, 2005).

**Empirical Literature: Quality of Health Care**

Research investigating the definition of quality health care has been described from the perspective of patients (Backhouse & Brown, 2000; Irurita, 1999; Oerman & Templin, 2000; Tasso, et al., 2004; S. Williams, 1998), the provider (Cody & Squire, 1998; Jackson-Frankl, 1990; A. Williams, 1998; R. Williams, 1998), and comparisons of patient and nurse perceptions (Larson, 1997; Young, Minnick, & Marcantonio, 1996) of quality nursing care using qualitative and quantitative methods. Additional research was related to nurse and patient perceptions of quality compared to commonly used indicators (Lynn & Moore, 1997).

Research on provider perceptions of quality care was the earliest performed in an attempt to define quality health care. Jackson-Frankl (1990) completed a qualitative study to investigate staff nurse and nurse administrator use of language and the meaning of quality care. Nurse administrators described quality as an “ideal” or a “wish list.” For this group “money or finances was a critical element in the concept of quality” (Jackson-
Frankl, p. 57). Nurse managers in this study described quality nursing care as setting and achieving standards and utilization of resources as evidence of quality.

Cody and Squire (1998) employed qualitative methodology to describe nurse perceptions of good nursing care through storytelling. Eight participants were interviewed following Bruner’s method of storytelling. The stories revealed essentials of good nursing care to include good communication and the provision of patient-centered care.

Nurse perceptions of quality nursing care were also investigated by A. Williams (1998). Grounded theory was used to explore perceptions of ten purposively selected practicing nurses using recorded interviews, published literature, and participant observation. High quality nursing care was described as “meeting all the needs of the patients or clients you’re looking after” (A. Williams, 1998, p. 810).

R. Williams (1998) described nurse perception of quality nursing care using a qualitative design. Twenty-seven nurses in management were interviewed and four categories of quality were identified. Categories of quality included meeting patients’ needs to accomplish outcomes; providing patient-oriented care; clinical competence; and providing the patient with knowledge. Nurses in the study agreed that quality care can be measured by using patient satisfaction, outcomes, and the amount of health education. This study provides data rich with nurses’ description of quality; however, R. Williams did not describe the techniques of data collection or analysis, which limits the ability to judge the validity of the findings.

Studies were also conducted to evaluate quality care from the perspective of the patient. S. Williams (1998) studied 259 patients receiving chemotherapy in both in-
patient and out-patient settings. The Holistic Caring Inventory (HCI) was administered to “examine the dimensions of nurse caring that contribute to patients’ perceptions of quality and patients’ perceptions of nurse caring behaviors” (S. Williams, p. 20). Findings revealed that patients interpret nurses caring as a physical and sensitive caring attitude.

Irurita (1999) used grounded theory with 23 participants to explore patients’ perspective of quality nursing care in Western Australia. Themes identified were “the personal touch, doing more than the job was perceived to require, the little extras to ensure physical and emotional comfort, being there for patients (sustaining presence)” (Irurita, p. 87). Irurita also identified intervening factors that affect the quality of care as environmental, organizational, the type of hospital, coordination of care and communication between staff, consistency of care-giving, and time available to develop a nurse-patient relationship.

Backhouse and Brown (2000) used a questionnaire for patients being discharged from a rehabilitation hospital unit to identify “the patient view of a positive hospital experience” (p. 32). Patients responded that they perceived their hospital experience to be positive if they were given information about plans of care and progress toward recovery and knew who their nurse was during each shift. This research provided basic information about one hospital’s attempt to improve patient quality at their facility.

Oerman and Templin (2000) performed an exploratory study to identify what consumers of health care identified as the most important attributes of quality health care quality and quality nursing care. This research used a convenience sample of 239 patients who were administered the Quality Health Care Questionnaire (QHCH) and the health-related quality-of-life survey (SF-36). The participants in this research indicated that the
most important aspect of health care that indicated quality nursing care was having nurses who were well informed and up-to-date, were good at interpersonal communication, taught about various aspects of health care, and assisted patients with coping. African American participants rated teaching by the nurse as more important than Caucasian participants. Older subjects, lower income, and lower levels of education were all correlated with higher scores of the importance of teaching by the nurse as an important factor in quality.

Tasso, et al. (2004) performed 49 patient interviews and recorded 133 observations of interaction of patients and hospital staff to investigate patient satisfaction and quality of care at one southeastern U.S. hospital. Patients most frequently reported that communication, timely attention to personal needs, and accessibility of staff enhanced satisfaction. Recorded observations indicated that staff most frequently performed technical care (24.8%) and infrequently engaged in interpersonal care (5.26%). This research is limited to one hospital with the findings used to enhance customer satisfaction at that facility.

Research comparing patient and nurse perceptions of caring, quality, and professional behaviors was also conducted. Young, et al. (1996) performed a descriptive comparative study using a random sample to evaluate the definition of quality care as perceived by the nurse, nursing management, and the patient. Seventeen hospitals participated in the study with a total of 2,051 patients, 1264 staff nurses, and 97 nurse managers. Nursing care was evaluated by phone or mailed questionnaire for physical care, patient participation in care, patient teaching, and pain control. A discrepancy was found between patients and nursing administration. Patients ranked patient teaching as
most important while nurse managers did not perceive this as most important to the patient. Nurses in this study recognized varying expectations of patients but did not rank patient teaching as highest priority. This study and Larson’s (1997) support the possibility that there may be a discrepancy between nurse and patient perceptions of quality.

Larson (1997) conducted a descriptive comparative study to identify nursing caring behaviors as perceived by the patient ($n = 57$) and nurse ($n = 57$) using the Caring Assessment Instrument (CARE-Q), a 50-item tool that measures caring behavioral items such as comforting, trusting, explaining and facilitating. Patients in the study ranked nurse knowledge and ability to use technical equipment higher than nurses rated these factors. Nurses ranked allowing patients to express their feelings and use of touch higher than was rated by patients.

Comparison of patient and nurse definitions of quality to commonly used indicators of quality was an additional area of research in the literature. Lynn and Moore (1997) investigated the relationship between traditional quality indicators and patient and nurse perceptions of quality nursing care. They utilized a retrospective correlational design with a non-random sample of 945 patients and 462 nurses. Traditional quality indicators used were patient volume, acuity of illness, and risk management indicators (falls, nosocomial infections, medication errors). Lynn and Moore found no correlations between patient perceptions of quality of nursing care received and traditional measurement tools. Nurse perception of quality nursing care was correlated only with the traditional volume indicator. The authors recognized issues of data quality in their study,
limiting generalization of findings. This research suggests that traditional indicators may not be reflective of nurse and patient perceptions of quality care.

**Summary: Quality of Health Care**

The perception of quality is complex and may differ among patients, providers, and administrators. Qualitative research reviewed had a common theme: nurses and patients perceived quality as patient-centered care (Cody and Squire, 1998; Irurita, 1999; A. Williams, 1998; R. Williams, 1998). Patients perceived quality when nurses were knowledgeable (Oermann & Templin, 2000), provided information (Backhouse & Brown, 2000; Oermann & Templin), were caring (Irurita; S. Williams, 1998), and attended to individual needs (Oermann & Templin; Tasso). Oermann & Templin also noted that attributes of quality varied by age, ethnicity, and income level. Nurses in the studies agreed that quality can be measured through outcomes and patient satisfaction. Hospital management included cost and appropriate utilization of resources as a measure of quality (Jackson-Frankl, 1990). Quantitative methods that compared patient expectations to nurses were used by Larson (1997), Young, Minnick, and Marcantonio (1996), and Lynn and Moore (1997). These studies demonstrated conflicting findings between nurses’ and patients’ evaluations of what factors indicate quality.

Quality health care is a generic concept which has become a national issue. Government agencies and states now recognize the need to improve quality of care for patients through the identification of patient preferences and the measurement of outcomes (About, n.d.; Adams & Corrigan, 2003; DHHS Hospital Quality Alliance,
2005; DHHS Hospital Quality Initiative, 2005; PHC4 About the Council, n.d.). Quality has been described and measured with conflicting findings between patients and health care providers. Traditional measures of quality used by health care workers may not represent patient- or nurse-defined quality care. Prior research supports the use of effectiveness of care as a general measure of quality of care using specific outcomes to serve as indicators for effectiveness of care. Given the recommendations of the IOM (2001) it has become imperative to identify patient perceptions of quality care and determine how those perceptions link to patient outcomes.

**Outcomes**

**Theoretical Literature: Outcomes**

The focus on outcomes developed from the rising cost of health care in the 1970s (Clancy & Eisenberg, 1998; Guadagnoli & McNeil, 1994). Other factors have influenced the growing interest in outcomes measurement. These include health care consumers who want information about their providers and health care providers who want to determine the most appropriate, cost-effective treatment (Adams & Corrigan, 2003; Donabedian, 1990; Kohn, et al., 1999; McGlynn, et al., 2003; Oermann, 1999). The measurement of outcomes is also used to make decisions about the quality in health care, effectiveness of care, and the allocation of resources (Guadagnoli & McNeil; Petitti, 1998). The primary goals of measuring outcomes are to identify the link between care and outcomes and establish the effectiveness of care in “real world” situations (Guadagnoli & McNeil).
Outcomes are now used to evaluate effectiveness of care for patients, various medical treatments, effectiveness of clinicians, and cost of treatments. Outcome indicators may include traditional medical measures such as mortality, morbidity, and clinical measures (e.g., blood pressure). Other outcome measures suggested are patient preferences, assessments of physical functioning, mental well-being, health-related quality-of-life, cost of care, and patient satisfaction (Clancy & Eisenberg; Drummond, et al., 1997; Guadagnoli & McNeil; Johnson, 2002).

In 1994 the American Nurses Association (ANA) identified a need to investigate and identify the empirical links between patient outcomes and nursing care in acute care facilities (ANA, n.d.). ANA’s safety and quality initiative resulted in the collection of data from 1,000 hospitals across the U.S. This data was used to link patient outcomes to nursing care (ANA, n.d.). Outcomes that were identified as sensitive to nursing care included hospital-acquired infections and patient satisfaction (ANA, n.d.). Marek (1997) and Whitman (2004) suggested that additional patient outcomes that are sensitive to nursing care include quality of life, functional status, knowledge, home function, and safety. Miller, et al. (2005) noted that investigation of outcomes should be explored in setting where NPs are used. Traditional medical outcomes, such as mortality rates and clinical measures, have commonly been used to evaluate outcomes for patients when care is provided by NPs (Kleinpell-Nowell & Weiner, 1999). Kleinpell-Nowell and Weiner suggested that the selection of appropriate patient outcomes related to advanced practice nursing (APN) care should depend on the type of patient, type of APN, and the purpose of the research.
Outcomes have been measured for patients in primary care, long-term care, and hospital settings when care was provided by NPs. Original outcomes were evaluated in primary care since NPs have practiced in that area since the inception of the role in the 1970s (Keeling & Bigbee, 2005; U.S. Congress OTA, 1986). Evaluation of outcomes for patients in acute care has evolved along with the changes in health care in the 1990s with the development of a new advanced practice nursing (APN) role, the acute care nurse practitioner (ACNP), created in 1995 in response to changes in acute care facilities. It was more common for Clinical Nurse Specialists (CNS), Neonatal Nurse Practitioners (NNP), and Certified Nurse Midwives (CNM) to work in acute care prior to that time. At the same time, NPs who were educated as ANPs or FNPs were moving into acute care settings.

The most recent body of research investigated the outcomes for patients who received NP care in hospital settings and the immediate post-discharge period. Hospital settings included in-patient units and hospital emergency departments. The type of NP in the research reviewed was often not defined (Carroll, et al., 2007; Counsell & Gilbert, 1999; Cowan, et al., 2006; Dahle & Penque, 2001; Dahle, et al., 1998; Miller, 2001; Mills & McSweeney, 2005; Ritz, et al., 2000; Sakr, et al., 1999; Sakr, et al., 2003). The current research on outcomes for NPs working in hospital settings was modeled after the early research of NPs in primary care. Research methods for prior studies are primarily descriptive or comparative, with limitations of small convenience samples with few specific clinical conditions studied.

In the past, APNs working in acute care have traditionally been those with the role of the CNS, NNP, and the CNM (Keeling & Bigbee, 2005). NPs had originally been educated to provide primary care services (Keeling & Bigbee). NP specialty roles may now include the FNP; ANP; and the newest specialty, the ACNP. Practice sites of NPs have also evolved with the changes in health care and the creation of the ACNP role. Practice sites of NPs now overlap with FNPs practicing in acute care (Miller, 2001) and ACNPs practicing in primary care settings (Kleinpell, 2005). It is proposed that in addition to the ACNP, FNPs and ANPs may be utilized in acute care and possess the skills necessary to practice in acute care.
Empirical Literature: Patient Outcomes in Primary Care


The research on patient outcomes for NPs in primary care appeared in the literature as early as 1971 (Brown & Grimes, 1995; Feldman, et al., 1987). The research selected for inclusion in this review was limited to more recent studies that identify the range of consensus of outcomes for NPs in primary care. The research was selected using the following criteria: synthesis, meta-analysis, and the use of experimental or quasi-experimental designs. These criteria were used in order to select major reviews or studies that demonstrated rigorous designs. Five major reviews on the effectiveness of NPs in primary care were identified and are included. The reviews were selected for their comprehensive evaluation of NPs in primary care (Brown & Grimes, 1995; Crosby, et al., 1987; Horrocks, et al., 2002; Laurant, et al., 2004; U.S. Congress OTA, 1986). Research
using experimental or quasi-experimental designs was seen in the literature since 2000 (Mundinger, et al., 2000; Venning, et al., 2000).

The U.S. Office of Technology Assessment (U.S. OTA, 1986) conducted a study to understand how the use of NPs, PAs, and Certified Nurse Midwives (CNMs) affect the quality, access, and costs of patient care. OTA described practice sites and patient outcomes for NPs, PAs, and CNMs. The outcomes for access to care, productivity, cost, patient satisfaction, and costs of care were used to compare physicians to NPs, PAs, and CNMs for all measures. The study concluded that NPs, PAs, and CNMs can often substitute for physician care or complement physicians’ services. These providers were also found to decrease costs of a medical practice. OTA also found that the patient care provided by NPs, PAs, and CNMs was equivalent to physicians for all outcomes used in the study.

Crosby, et al. (1987) identified 56 research studies from a total of 256 appropriate documents relevant to patient outcomes for NPs in primary care. The selected studies appeared in refereed journals from the years 1974 to 1983. The articles that were selected for inclusion were chosen by a panel of experts using the following criteria: relevance, clarity, and methodological rigor. A synthesis of the studies identified by Feldman, et, al. was then performed by Crosby, et al. (1987); this synthesis evaluated the utilization of NPs, delivery of care, short-term outcomes, and long-term outcomes. Crosby, et al. concluded that NPs performed a combination of nursing and medical functions. The authors also concluded that NPs improved patient satisfaction, improved access to care, decreased costs, and had a positive effect on patient compliance with treatment.
Brown and Grimes (1995) conducted a meta-analysis on effectiveness of NPs and CNMs to determine the impact that these providers have on patients in primary care settings. Published and unpublished data was used from 53 studies (38 NP studies, 15 CNM studies) using strict inclusion criteria. The main criterion for inclusion was the use of a physician comparison group or control group. Data analysis included determining effect size for each variable. Brown and Grimes concluded that patients who had care provided by NPs had more lab studies ordered (compared to physicians), were more satisfied with care, had medical conditions treated appropriately with resolution of symptoms, and had similar functional status and unplanned use of the emergency department.

Mundinger, et al. (2000) conducted a randomized trial to compare outcomes for patients (n = 1,316) in community clinics. Patients were cared for by either NPs or MDs. The outcomes measured were patient satisfaction, health status, physiologic tests, and service utilization. The results of the study indicated that there were no significant differences for patients’ health status or service utilization. There was no difference for patient satisfaction after the initial appointment; however, physician satisfaction was found to be higher than NPs at 6 months on the measure of provider attribute. A significant finding was for a physiologic measure, with patients who were being treated for hypertension having a statistically significant lower diastolic blood pressure reading when care was provided by an NP.

Lenz, Mundinger, Kane, Hopkins and Lin (2004) conducted a two year follow-up on the Mundinger, et al. (2000) study participants. The purpose of this study was to identify if there were any significant difference for patients between the NP group and
MD group for the outcomes of satisfaction, health status, physiologic tests, and service utilization over time. A total of 406 of the original 1,316 participants completed this phase of the research. This group of patients was limited to those who could be located and interviewed, visited their original provider in two years following the original study, and saw their original provider as the sole contact for health care during the two years following the original study. There were no differences for patients between the NP and MD groups for all demographic variables. Patients without health insurance more frequently saw the NP group. Findings from this study indicated that there were no significant patient differences for health status, physiologic indicators, or satisfaction. It was noted that on two of the subscales for patient satisfaction, visits-based continuity and communication, approached statistical significance with MD group having higher scores. Patients in the MD group had a higher level of service utilization in over time with a higher number of visits to the study MDs and to specialists during the second year of the study (P = .001). Lenz, at al. noted caution in the interpretation of findings since the smaller sample size used in this phase of the research resulted in low statistical power for physiologic variables and patient satisfaction.

Venning, at al. (2000) compared the cost effectiveness of MDs to NPs in primary care. The study was a randomized multi-center trial (n = 20 sites; n = 1,303 patients). Factors that influenced costs were also evaluated. These factors were prescriptions written, referral rates, and return visits. There was no significant difference between groups for the outcomes studied. Venning, et al. noted that the health services costs of consultation with NPs were 12.5% lower than for those with MDs, but that this was not found to be statistically significant.
A meta-analysis was conducted by Horrocks, et al. (2002) to determine whether NPs provided primary care that is similar to MDs. The researchers included only randomized control trials and prospective studies (n = 34) identified using a computerized search of CINAHL, Medline, and Embase from 1966 to 2001. The patient outcomes that were evaluated included satisfaction and health status. Provider outcomes included cost and process of care measures (i.e., referrals, patient adherence, number of prescriptions written). Data analysis revealed that NPs provided a statistically significant (p < 0.00001) longer consultation time for patients compared to MDs. There were no statistically significant differences were found for number of prescriptions written, return visits, or referrals. The data on patient satisfaction suggested patients were more satisfied with NPs.

Laurant, et al. (2004) conducted a systematic review to evaluate the impact for patients when substituting a nurse for physician services in primary care settings. Twenty-five articles met inclusion criteria. No significant differences were found between physicians and nurses for health outcomes in this study. Nurses in the studies reviewed included APNs, FNPs, and CNSs. Laurant, et al. noted that while there were no appreciable differences for the outcomes reviewed, significant limitations of the studies reviewed were that only one study had power to determine equivalence of care and that the number of outcomes were so varied, which limited the synthesis of data.
Empirical Literature: Patient Outcomes in Acute Care

Research identifying the outcomes for patients who received NP in acute care was identified in the nursing literature during the 1990s. Outcomes were measured in hospital outpatient, emergency, and in-patient departments using the measures satisfaction (Blunt, 1998; Chang, et al., 1999; Mabrook & Dale, 1998; Rhee & Dermyer, 1995; Sakr, et al, 1999), patient acuity levels (Blunt; Mills & McSweeney, 2005), clinical outcomes (Chang, et al.), x-ray interpretation (Mabrook & Dale ), incorrect or missed diagnoses (Sakr, et al., 1999). The study of outcomes of patients in hospital units and immediately after discharge from hospitals was the most recent research available.

A summary of the research related to outcomes for patients cared for by NPs in acute care and following hospital discharge is presented in Table 2.1. The studies are grouped by setting (hospital outpatient department, emergency department, acute care, and immediate post-hospital period) and then by year (from oldest to most recent study). Research conducted outside of the U.S. was also noted.

Table 2.1. Summary of Research of Patient Outcomes Related to Nurse Practitioner Care in Acute Care

<table>
<thead>
<tr>
<th>Author/Year</th>
<th>Type of Study/ Sample Size</th>
<th>Outcomes Studied</th>
<th>Setting</th>
<th>Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>McCaig, Hooker, Sekscenski, &amp; Woodwell (1998)</td>
<td>Descriptive (n = 57,452)</td>
<td>Patient characteristics Types of clinics</td>
<td>Hospital Outpatient Departments</td>
<td>8% of all patients in U.S. outpatient departments are seen by NPs/PAs. Patients who are younger And less acutely ill see</td>
</tr>
<tr>
<td>Study</td>
<td>Methodology</td>
<td>Table</td>
<td>Description</td>
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<tr>
<td>Mills, McSweeney, &amp; Lavin (1998)</td>
<td>Descriptive (n = 2,399)</td>
<td>Patient Characteristics</td>
<td>Hospital Outpatient Departments</td>
<td>More women and children saw NPs than PAs. PAs more likely to practice in rural areas. NPs ordered fewer Diagnostic tests than PAs.</td>
</tr>
<tr>
<td>Rhee &amp; Dermyer (1995)</td>
<td>Descriptive Comparative (n=60)</td>
<td>Patient satisfaction</td>
<td>Emergency Department</td>
<td>Patients just as satisfied with NP care as compared to MD care.</td>
</tr>
<tr>
<td>Blunt (1998)</td>
<td>Descriptive Comparative (n = 50 for patient satisfaction; n = 14,312 for acuity level)</td>
<td>Patient satisfaction</td>
<td>Productivity</td>
<td>Emergency Department</td>
</tr>
<tr>
<td>Mabrock &amp; Dale (1998) (UK)</td>
<td>Descriptive (n = 6,944)</td>
<td>Correct diagnoses</td>
<td>Patient satisfaction</td>
<td>Emergency Department</td>
</tr>
<tr>
<td>Study</td>
<td>Type</td>
<td>Design</td>
<td>Setting</td>
<td>Patient Characteristics</td>
</tr>
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<tr>
<td>Chang, et al. (1999) (Australia)</td>
<td>Descriptive</td>
<td>Comparative</td>
<td></td>
<td>Patient satisfaction</td>
</tr>
<tr>
<td>Sakr, et al. (1999) (UK)</td>
<td>Descriptive</td>
<td>Comparative</td>
<td></td>
<td>Adequacy of care</td>
</tr>
<tr>
<td>Sakr, et al. (2003) (UK)</td>
<td>Retrospective</td>
<td>Descriptive</td>
<td></td>
<td>Direct costs of care</td>
</tr>
<tr>
<td>Mills &amp; McSweeney (2005)</td>
<td>Descriptive</td>
<td></td>
<td></td>
<td>Patient characteristics</td>
</tr>
<tr>
<td>Study Authors and Year</td>
<td>Design and Sample Size</td>
<td>Indicators</td>
<td>Setting</td>
<td>Findings</td>
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<tr>
<td>Knaus, Felten, Burton, Fobes, &amp; Davis (1997)</td>
<td>Descriptive Comparative (n = 1,320 patient contacts)</td>
<td>Prescriptions written</td>
<td>Hospital</td>
<td>No significant differences for mortality, morbidity, occurrence of adverse events, or patient satisfaction.</td>
</tr>
<tr>
<td>Rudy, et al. (1998)</td>
<td>Descriptive Comparative (NPs n = 11; PAs n = 5; MDs n = 54)</td>
<td>Patient satisfaction, Clinical outcomes: mortality, morbidity, adverse events</td>
<td>Hospital</td>
<td>No significant difference for mortality, length of stay, or re-admission.</td>
</tr>
<tr>
<td>Counsell &amp; Gilbert (1999)</td>
<td>Descriptive (n = 1 NP)</td>
<td>Length of stay, Cost of Care, Patient satisfaction</td>
<td>Hospital Neuro-surgical unit</td>
<td>Decreased length of stay from 1.7 to 1.2 days. Cost savings of $1,346/patient.</td>
</tr>
<tr>
<td>Sarkissian &amp; Wennberg (1999) (Canada)</td>
<td>Descriptive Comparative (3 groups; before NPs, within 1 year,</td>
<td>Length of stay, Cost of care</td>
<td>Hospital Seizure unit</td>
<td>Decreased length of stay for NP groups (M = 12.1 vs 9.7 vs 7.5).</td>
</tr>
<tr>
<td>Study &amp; Outcome</td>
<td>Study Design</td>
<td>Sample Size</td>
<td>Outcomes</td>
<td>Results</td>
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<tr>
<td>Ritz, et al. (2000)</td>
<td>Experimental (n = 211)</td>
<td></td>
<td>Quality of life, Cost of care</td>
<td>Patients in experimental group (NP care) had better quality of life, less uncertainty (p = 0.001). No significant difference for cost of care.</td>
</tr>
<tr>
<td>Dahl &amp; Penque (2001)</td>
<td>Retrospective Descriptive Comparative (n=1,192)</td>
<td></td>
<td>Length of stay, Mortality, Readmission rates</td>
<td>Increased length of stay for treatment group (M = 5.6 vs 5). Decreased mortality (M = 3.1% vs 7.9%). Decreased readmission rates (M = 4.7% vs 8.4%).</td>
</tr>
<tr>
<td>Miers (2002)</td>
<td>Retrospective Descriptive Comparative (n=215)</td>
<td></td>
<td>Length of stay, Cost of care, Patient satisfaction</td>
<td>Patient length of stay was decreased by 1.91 days for NPMD group (M = 6.62 vs. 4.71). Cost of care was decreased by $5,038.91 per patient for NP/MD group (M = $21,023 vs. $15,985). No significant difference For patient satisfaction.</td>
</tr>
<tr>
<td>Lambing, et al. (2004)</td>
<td>Descriptive comparative retrospective</td>
<td>Cost of care</td>
<td>Hospital Geriatric population</td>
<td>Patients in NP/MD group more frequently had physical therapy orders</td>
</tr>
<tr>
<td>Study</td>
<td>Design</td>
<td>Sample Size</td>
<td>Measures</td>
<td>Findings</td>
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<tr>
<td>Hoffman, et al. (2005)</td>
<td>Descriptive</td>
<td>(n = 526)</td>
<td>Re-intubations</td>
<td>Patients in NP/MD group had less re-intubations (p = .02).</td>
</tr>
<tr>
<td></td>
<td>comparative</td>
<td></td>
<td>Duration of mechanical ventilation</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(n = 526)</td>
<td></td>
<td>Re-admission</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Length of stay</td>
<td>No significant differences for duration of mechanical ventilation, re-</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>admission, length of stay, or mortality.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Mortality</td>
<td></td>
</tr>
<tr>
<td>Cowan, Shapiro, Hays, &amp; Afifi (2006)</td>
<td>Quasi-experimental</td>
<td>(n = 1,207)</td>
<td>Cost of care</td>
<td>Decreased costs for NP/MD group (profit per patient of $1,707).</td>
</tr>
<tr>
<td></td>
<td>2 group</td>
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<td></td>
<td></td>
<td></td>
<td>Length of stay</td>
<td>Decreased length of stay for NP/MD group (M = 5 vs 6 days).</td>
</tr>
</tbody>
</table>

(n = 100 patients; n = 17 providers) Re-admission Mortality and nutrition consultation (p<.001).

Patients in the NP/MD group were older patients (P = .022), with more musculoskeletal problems (p = .036).

NP/MD group also had a higher patient acuity level (p < .001).

NP/MD group had higher cost and length of stay. No difference in cost/day.

No significant between group differences for re-admission and mortality.
<table>
<thead>
<tr>
<th>Study</th>
<th>Design</th>
<th>Group Size</th>
<th>Outcome Measures</th>
<th>Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sidani, et al. (2006)</td>
<td>Descriptive comparative (n = 123)</td>
<td>Functional status, Health related quality of life (HRQOL), Patient satisfaction, Symptoms resolution</td>
<td>Hospital 3 patient populations: CABG surgery, Knee or hip replacement, Spinal surgery, Fracture repair</td>
<td>Patients receiving care from NPs had higher physical functioning (P = .010), role limitations due to physical health (P = .000), and mental health (P = .000) measured on HRQOL. Patients receiving care from NPs had higher levels of satisfaction (P ≤ .05) No statistically significant difference for symptoms.</td>
</tr>
<tr>
<td>Tranmer &amp; Parry (2004)</td>
<td>Experimental (n = 184)</td>
<td>HRQOL, Symptom distress, Unplanned contact with hospital, Patient satisfaction</td>
<td>Post-hospital support for CABG surgery patients</td>
<td>No significant difference between the NP and non-NP group for HRQOL, unplanned contact with the hospital, or symptoms. Patients in the NP group had a higher satisfaction with care after discharge but not overall satisfaction ratings.</td>
</tr>
<tr>
<td>Carroll, Rankin, &amp; Cooper (2007)</td>
<td>Experimental (n = 247; 4 groups)</td>
<td>Re-admission, Participation in cardiac rehabilitation</td>
<td>Post-hospital home visits and phone support for patients following CABG surgery and MI</td>
<td>No significant difference for hospital re-admissions. Patients had an increased participation in cardiac rehabilitation for the CABG and MI group who received phone support from APNs (P &lt; .0005).</td>
</tr>
</tbody>
</table>
The earliest evaluation of NPs in acute care was performed to describe the role function and characteristic of patients who saw NPs in hospital out-patient departments. McCaig, Hooker, Sekscenski, & Woodwell, (1998) performed a descriptive retrospective study using two years of data from a random selection of patients from U.S. hospital outpatient departments. The purpose of the research was to determine if the volume and characteristics of patients cared for by PAs and NPs in hospital outpatient departments differed from patients cared for by physicians. Variables studied were patient characteristics, tests and procedures performed or ordered, and medications prescribed. Data was collected from 95 percent of the eligible hospitals (a 95% response rate) resulting in 57,452 patient records reviewed. The study documented that 8% of patients seen in hospital outpatient visits nationally saw NPs and PAs as their health care providers. Patients who were younger and female with general medical or obstetrical/gynecologic problems more frequently saw NPs and PAs. The NP/PA group ordered a statistically significant greater number of diagnostic tests and provided more education and counseling than the MD group. This study does not account for the increased use of NPs in all clinical areas of acute care. NPs practicing in acute care are more likely to care for all types of patients with complex health conditions.

Mills, et al. (1998) performed an exploratory study to compare characteristics of patients seen by NPs to those seen by PAs in hospital outpatient departments. They also performed a logistic regression to determine which patient characteristics predict care by an NP or PA. NPs were more likely than PAs to provide health education and counseling.
NPs were also more likely to provide care for women and children. Rural outpatient visits were predicted to PAs.

A second group of research identified was the evaluation of outcomes for patients seen by NPs in hospital emergency departments (Blunt, 1998; Chang, et al., 1999; Cole & Ramirez, 2000; Mabrook & Dale, 1998; Mills & McSweeney, 2005; Rhee & Dermyer, 1995; Sakr, et al., 1999). Rhee and Dermyer used a descriptive correlational design to evaluate patient satisfaction with care performed by NPs in an emergency department compared to care provided by an MD. This was a 2-group design with 30 participants in each group (60% of the NP patient population). A phone survey was completed. Appropriate statistical analyses (t-test) were performed. Overall satisfaction for both groups was good, with an NP group mean of 3.9 and physician mean of 4.0. (using a scale of 1 = poor and 5 = excellent). There was no significant difference between the MD and NP groups (p < .05).

Blunt (1998) conducted a descriptive, comparative, retrospective study using chart reviews (n = 14,312) in one urban emergency department to evaluate the role, efficiency, productivity, and cost effectiveness of the NP in the ED. Patient satisfaction was also measured on a sub-set of the population studied (n = 50). Charts for all health care providers were reviewed for level of acuity and total numbers of patients seen by each provider. In addition, 50 patients who were cared for by the NP were contacted by phone to complete a satisfaction survey. Blunt found that patients with non-urgent complaints comprised 62% of the NP patient population, with 32% of patients with non-urgent conditions seen by the NP. The NP saw a similar number of patients as the physicians but the statistical analysis was not discussed. Therefore, it cannot be
determined if the volume of patients seen by the NP or MD was statistically different. This research supports the role of the NP as a provider of care in a hospital ED. The use of the NP allows the MD to focus on patients with more urgent or emergent problems, and therefore less acutely ill patients can be seen in a more timely manner. A limitation of Blunt’s study is the difficulty in comparing patient satisfaction between NPs and MDs. NPs were given “high” patient satisfaction ratings, while the ratings of MDs were not provided. Patient satisfaction findings for the NPs may have been related to lower acuity of patients cared for by NPs.

Mabrook and Dale (1998) performed a descriptive study collecting data over one year (n = 6,944) in the United Kingdom (UK). The outcomes measured were patient satisfaction, volume of patients treated by the NPs, and x-ray interpretation. The authors provided no information on tools or instruments used to gather data. Mabrook and Dale concluded that NPs provide an effective service to the community. There is no supporting statistical analysis provided. The methods discussion of the research provides some descriptive statistics on the number of patients seen and the percent of incorrectly interpreted x-rays.

Chang, et al. (1999) compared the effectiveness of care for patients with blunt limb trauma and wound management cared for by NPs compared to physicians in a rural emergency department in Australia. The study was a randomized quasi-experimental design to investigate whether NPs are able to provide health services for common complaints in remote rural emergency department settings (n = 169 wound cosmesis, n = 132 patient satisfaction). The outcomes evaluated were patient satisfaction, wound outcomes, appropriateness of patient treatment, and waiting times. Data were collected
over seven months and included information on demographics, history of health services used, the documented clinical assessment, clinical management plan, clinical review to determine appropriateness of treatment, client satisfaction, and wound cosmesis. The results demonstrated no significant difference for all outcomes between the NP and physician group. This study supports the notion that NPs provide effective care for patients receiving wound care. The study is limited to one rural hospital in Australia that may not be applicable to the patient population in the US.

Sakr, et al. (1999) compared the care and outcomes of patients with minor injuries cared for by NPs to those cared for by resident MDs in one hospital ED in the UK. Patients (n = 1,453) were randomly assigned to be seen by the resident or the NP. Each patient was also evaluated by the researcher, who was an attending MD. The outcomes evaluated were adequacy of care (history taking, examination of patient, interpretation of x-rays, treatment, education, and follow-up) and patient satisfaction. Clinical errors were made in 9.2% of patients, though there was no difference between the NP or resident MD group. NPs were better than resident MDs at recording the history and providing education. No significant difference was found for accuracy of exam, follow-up, or interpretation of x-rays. The patient satisfaction survey was sent to all patients 28 days after their treatment in the ED. There was no significant difference between the groups for patient satisfaction.

Sakr, et al. (2003) evaluated the outcome adequacy of care and cost for 2,762 patients in one hospital ED in the UK. Patients were evaluated by two providers, an NP and MD. Each patient was initially assigned to receive care from an NP or MD and was then evaluated by the opposite provider. Charts were reviewed for the following
outcomes: appropriate history, interpretation of x-rays, treatment decision, and follow-up care. The data analysis that revealed there were no significant differences between NPs and MD patient groups for adequacy of care. Adequacy of care included the number of errors in clinical assessment and treatment. A significant difference was found for unplanned follow-up, with the MD group having a greater percent of unplanned follow-up. The NP group had a greater rate of referrals, which resulted in increased costs. Findings from this study indicated that it was more expensive for NPs to provide care in this setting since they more frequently consulted MDs or referred patients for additional care. Sakr, et al. suggested that it may be difficult to compare costs for two providers since each had a statistically significant different case mix.

Mills and McSweeney (2005) described the practice patterns of NPs in hospital EDs. They used a national sample over a four-year time period and found that NPs saw 5.76 million patients during that time. Patients with minor conditions, such as musculoskeletal injuries, lacerations, and common respiratory problems were more frequently seen by NPS. NPs also evaluated patients with more serious complaints, including chest pain, fever, and digestive problems. This research demonstrates that patients with minor and more serious complaints are seen by NPs.

The most recent research on patient has been in hospital in-patient units and for patients in the immediate post-hospitalization period. Knaus, et al. (1997) conducted a descriptive survey of NP work activities, quantity of patients, and patient and physician satisfaction with NPs in three hospital departments. In addition, the study compared clinical outcomes (i.e., mortality, morbidity, occurrence of adverse events) and work activities to NP and PA or resident MDs. The study was conducted in one hospital as a
project to develop job descriptions for newly employed NPs. Resident were found to spend more time working, providing hands-on treatment, and serving as a preceptor, and they had a larger caseload of sicker patients. The NP/PA group spent significantly more time reviewing chart notes, and interacting with the patients’ family members. No significant between-group differences were found for any clinical outcome. The authors concluded that NPs in the study provided less fragmented and more holistic care to patients with complex health problems.

Rudy, et al. (1998) conducted a study that compared care a NP/PA group to a resident MD group on care activities and patient outcomes in a hospital setting. The authors used a descriptive, comparative, longitudinal design with a convenience sample that matched each NP or PA with a resident MD. Care activities of each group were described and the clinical outcomes of in-hospital mortality, length of stay, occurrence of drug reactions, readmission rates, and completeness of admission notes were evaluated. Resident MDs were described as caring for older and more acutely ill patients. There were no significant between-group differences for the clinical outcomes measured. This research is consistent with Knaus, et al.’s (1997) findings. However, this study did not separate the NPs from PAs; all of the findings were reported for the NPs/PAs as one group. These findings do not provide information about the unique abilities of the NP group to provide care to a specific group of patients.

The most recent body of research investigates patient outcomes for NPs who provide direct care to patients on different types of clinical units in hospitals. Dahle, et al. (1998) evaluated the impact of NPs on the cost of providing care to hospital patients (n = 265) with uncomplicated heart failure. Other outcomes evaluated included length of stay
and 30-day readmission rates. The NP group had a statistically significant lower cost of care compared to the non-NP group. There was no significant difference between groups for length of stay or readmission rates.

Counsell and Gilbert (1999) investigated the impact of adding an NP as a member of the team providing care to patients in a hospital neurosurgical unit. The outcomes studied were length of stay, costs, and patient satisfaction. The authors noted a decreased length of stay and cost of care with improved patient satisfaction. This research study has limited validity since it does not provide presentation of data, instruments used, or description of the statistical analyses.

Sarkissian and Wennberg (1999) used a retrospective descriptive design to study the impact of introducing the use of NPs for patients in a two-bed epilepsy monitoring unit in a single hospital setting in Canada. Data was collected on length of stay, laboratory tests ordered, and overall cost of care using chart audits for a 28 month period (n = 101). Patient satisfaction was also measured. The authors found a statistically significant reduction in the length of stay, laboratory tests ordered (overall reduction), and cost of care after introduction of the NP. Patients were described as being satisfied with the care received, although statistical analysis was not performed on this variable because of the lack of appropriate data. Sarkissian and Wennberg’s study demonstrates some positive patient outcomes in one specific population in a small acute care setting in Canada. This finding may not provide evidence for the appropriate measurement of patient outcomes for a similar group of patients in the US.

Ritz, et al. (2000) conducted a study using an experimental design to evaluate outcomes for patients newly diagnosed with breast cancer when advanced practice nurses
(APN) are used to deliver care. A control group (n = 104) received standard medical care while the experimental group (n = 106) received standard care plus APN interventions. Theoretical models (Brooten’s Cost-Quality Model and Oncology Nursing Society’s Standard of Care) were used to select the outcomes: cost and quality-of-life. Quality-of-life was measured as uncertainty and was significantly lower (p = 0.001) for the treatment group. Costs of care were not found to be different between the two groups. This study represents rigorous methods and outcomes that are sensitive to all types of nursing care. Additionally, the treatment group was followed by APNs in the hospital and at home, allowing for additional interventions which may not occur in a hospital setting. APNs were not defined by the authors, so one cannot determine if the APNs were NPs, Clinical Nurse Specialists (CNS), or some other type of APN.

Dahl and Penque (2001) studied the effects on hospitalized patients with heart failure when NPs delivered care. A retrospective comparative descriptive design was performed with a convenience sample of 1,192 participants. The data was retrieved from medical records for a one-year time period covering 1996 to 1997. The outcomes evaluated were length of stay, mortality, and readmission rates. The group that received the NP-managed program had statistically significant decreased outcomes length of stay and mortality. Readmission rates were reduced at 30 and 90 days, but not at 15 days. Limitations of the study included the effects of time; advances in cardiac care that may have occurred during the period of the study; decreased length of stay; and mortality due to improvements in care.

Miers (2002) conducted a two-group retrospective descriptive comparative study that compared outcomes for patients who had CABG surgery. The researchers used
Donabedian’s Structure, Process, Outcomes Model as the framework. The study consisted of 215 participants from two units in one hospital for two separate years, one prior to the use of NPs and one after an NP was added to the team of care. The outcomes studied were length of stay and cost of care. The results of the statistical analysis determined that the use of NPs in collaboration with the cardiac surgeons resulted in a statistically significant decreased length of stay and cost.

Lambing, et al. (2004) conducted a study on hospitalized geriatric patients on the outcomes care activities and clinical outcomes using a sample of n = 100. NP/MD care was compared to MD/resident resident care (n = 17 providers) The NPs described in the study were ANPs and GNPs. Three clinical units in one hospital were used for the study. Data was collected using a professional care provider questionnaire and chart reviews. The NP group spent 28% of its time documenting progress notes (p = .011), while the resident group spent more time performing literature reviews (p = .008). Significant differences were also found for the NP group in more frequently ordering physical and occupational therapy consultation (p = < .001) and nutrition consultation (p < .001). Other results indicated that the NP group provided care for older patients with more musculoskeletal problems and who were sicker at admission and discharge. The resident group provided care for more cardiac patients (p = .001). There were significant between group differences for the clinical outcome length of stay and total cost, with the NP group having higher costs (p = .001) and length of stay (p < .01). There was no difference for cost per day or re-admission rates. This authors noted limitations of the study and concluded that additional research is needed to better understand the impact of NPs in acute care.
Hoffman, et al. (2005) compared outcomes for patients in a respiratory ICU using an NP/MD group and a pulmonary/critical care resident/MD group. Outcomes studied were duration of mechanical ventilation, re-intubation, workload, length of stay, mortality, and re-admissions. Patients who were admitted to the ICU were enrolled to the NP group for one month followed by enrollment in the resident group on an alternative month. A total of 526 patient records were evaluated. Patients groups did not differ for demographic data, though the NP group had a greater number of co-morbid conditions. No significant differences were found for workload, length of intubation, length of stay, mortality, or re-admission rates. The NP group had a lower rate of patient re-intubations ($p = .02$).

Cowan, et al. (2006) performed a comparative, two-group, quasi-experimental design ($n = 1,207$) to compare collaborative care between APNs and MDs to the usual care in a hospital general medicine department. The outcomes evaluated were cost, length of stay, and re-admission rates. The study results revealed that the APN/MD team care had statistically significant shorter length of stays and costs. There were no significant between-group differences for re-admission rates.

Ettner, et al. (2006) performed an investigation to examine the cost savings associated with a proposed model of care that involved a team of NPs and MDs. The design was quasi-experimental; the researchers used a convenience sample of patients who were admitted to one clinical unit in a hospital. Hospital staff, MDs, resident MDs, and NPs were randomly assigned to work groups. The study’s findings revealed that the MD/NP team care resulted in a net cost savings of $978 per patient.
Sidani, et al. (2006) measured functional status, health-related quality of life (HRQOL), patient satisfaction, and symptom resolution for patients (n = 123) in three hospital departments (orthopedic, neurologic, and cardiovascular surgery) in Canada. One group received care from NPs (identified as ACNPs) and one group from resident MDs. Data were collected for demographic variables and the number of co-morbid conditions. Satisfaction with care was measured using the Satisfaction with the Hospital subscale of the Patient Judgment of Hospital Quality Questionnaire (PJHQ), functional status was collected using the SF-36 questionnaire, and symptoms resolution was measured with the Symptoms Distress Scale (SDS). No difference was found between the groups for demographic or co-morbid conditions. Patients in the NP group had higher levels of patient satisfaction ($p < .05$). The data analysis for functional status revealed a higher ($p = .01$) level of physical functioning for patients in the NP group. This difference was determined to be of a moderate magnitude ($ES = -.50$). The NP group also experienced fewer role limitations due to physical health ($p = .000; ES = -.47$)) and mental health ($p = .000; ES = -.75$) with moderate and high magnitudes found. No significant between-group differences were identified for symptom control or sense of well-being. This research could be used as preliminary evidence of the contribution of the NP to patient outcomes in the population studied.

The last group of studies evaluated the patient outcomes in the immediate post-hospital period (Carroll, et al., 2007; Tranmer & Parry, 2004). Tranmer & Parry (2004) completed a two-group randomized trial for patients (n = 200) following hospital discharge for CABG in Canada. One group received APN telephone support and the control group received “usual” care. “Usual” care was defined as preoperative and
discharge information, as well as home care when needed. The outcomes HRQL, patient satisfaction, symptom distress, and unplanned contact with the hospital were measured using tools with documented validity. The APNs group received telephone support at days 3 and 5, and then weekly for 4 additional weeks. The APNs provided patients with information about management of symptoms and facilitated referral to community resources. Outcomes were measured for all participants at 5 weeks post-hospital discharge. No significant differences were found for HRQOL, unplanned contacts with the hospital, or symptom distress. Patients in the intervention group were had higher satisfaction scores, but overall scores were not found to be statistically significant. The researchers noted that scores for meeting patient needs after hospital discharge were higher in the intervention group and overall scores “trended” toward significance.

Carroll, et al. (2007) conducted a randomized clinical trial for 247 single, divorced, or widowed patients who were older than 65 and were discharged from five hospitals after CABG surgery or an MI. The study had four groups: MI control, MI intervention, CABG control, and CABG intervention. The control groups received standard care. The treatment groups received a home visit within 72 hours of hospital discharge and telephone support at week 2, 6, and 10 from an APN. In addition, the participants in the treatment group received weekly phone calls from a peer advisor. Peer advisors were individuals who were older than 60 years, had a history of an MI or CABG, and actively participated in cardiac rehabilitation programs. These individuals received training by the APN. The outcome measure for this study was subject participation in a cardiac rehabilitation program at 6 weeks and at 3, 6, and 12 months after the hospitalization. There was no significant difference between the two control
groups and two treatment groups at 6 weeks. Participation in cardiac rehabilitation was found to increase over time. The two treatment groups had a significantly higher participation in cardiac rehabilitation at 3 months ($p < .005$), 6 months ($p < .05$), and 12 months ($p < .05$).

**Summary: Patient Outcomes in Primary and Acute Care**

Patient acceptance and appropriate outcomes of care were evident in the literature reviewed for patients who received care from NPs in primary care and rural settings (Brown & Grimes, 1995; Crosby, et al., 1987; Horrocks, et al., 2002; Laurant, et al., 2004; Mundinger, et al., 2000; U.S. Congress OTA, 1986). The research about patient outcomes for patients who received care from NPs in primary care evaluated the ability of NPs to provide medical care to patients in office setting, often comparing the NP to MD on all outcomes. The early research was descriptive and used convenience samples. More recent studies used experimental designs to evaluate patient outcomes for NPs on selected patient outcomes in primary care (Lenz, et al., 2004; Mundinger, et al., 2000; Venning, et al., 2000).

Additional research developed following a change in patients who see NPs in hospital settings. The research in acute care follows the pattern of earlier research in primary care; it is descriptive or correlational and uses small samples. Quantitative and qualitative methods were employed in hospital outpatient departments, EDs, and in-patient units. The most common outcome measure evaluated was patient satisfaction (Blunt, et al., 1998; Chang, et al., 1999; Counsell & Gilbert, 1999; Knaus, et al., 1997;
Mabrook & Dale, 1998; Miers, 2002; Myers, et al., 1997; Rhee & Dermyer, 1995; Sakr, et al., 1999; Sarkissian & Wennberg, 1999; Sidani, et al., 2006; Tranmer & Parry, 2004). All studies using descriptive correlational methods reported no significant difference in patient satisfaction between NPs and physicians (Blunt; Chang, et al.; Knaus, et al., 1997; Miers; Rhee & Dermyer; Rudy, et al.; Sakr, et al., 1999; Sarkissian & Wennberg; Sidani, et al.; Tranmer & Parry) or between the NP and PA group and the physician group (Mills, et al., 1998).

The studies reviewed provided similar findings. Patients are satisfied with the care provided by NPs, and there was no difference in satisfaction for patients when care was provided by physicians or PAs compared to care provided by NPs in the settings studied. Patient treatment plans, adequacy of care, competency of tasks, number of misdiagnoses, and treatment outcomes were also similar for physician and NP groups (Chang, et al., 1999; Dahle, et al., 1998; Hoffman, et al., 2005; Knaus, et al., 1997; Mabrook & Dale, 1998; Rudy, et al., 1998; Sakr, et al., 1999; Sakr, et al., 2003).

There were conflicting findings for the outcome cost of care. Some research demonstrated that NP care for patients in a variety of hospital department resulted in a statistically significant cost savings (Counsell & Gilbert, 1999; Cowan, et al., 2006; Dahle, et al., 1998; Ettner, et al., 2006; Miers, 2002; Sarkissian & Wennberg, 1999). Other studies indicated that the cost of care was increased in the NP group or that no difference was found between NP care and MD care (Lambing, et al., 2004; Ritz, et al., 2000; Sakr, et al., 2003). In the research that evaluated length of stay (LOS) and cost of care, it appears that the two variables were related; when LOS increased, cost increased and vice versa (Cowan, et al; Counsell & Gilbert; Miers; Sarkissian & Wennberg). The
concept of quality health care has become a focus of policy makers and health care providers since the original quality report from the IOM in 2000 (Kohn, et al.). Subsequent reports focused national attention on patient safety issues and gaps in quality health care (IOM, 2001; Adams & Corrigan, 2003). Important foci of care are related to providing patient-centered care that is effective, identifying patient preferences, and customizing care (IOM, 2001). These foci should be applied to patients with high frequency, high cost conditions, such as ischemic heart disease and patients having CABG surgery (Adams & Corrigan). Quality health care is influenced by the structure and processes that occur in health care institutions (Donabedian, 1966; Holzemer, 1994; Mitchell, et al., 1998). NPs are one group of providers who have demonstrated positive outcomes for patients in primary care and rural settings; however, there is not enough information about the outcomes for patients in acute care. This study describes the perceptions of patients post CABG surgery related to health related quality of life and patient satisfaction when care is provided by NPs. This study also describes the outcomes for patients with a high frequency, high cost specific condition; CABG surgery when care is provided by NPs.

More recent research evaluated outcomes that influence general health and well-being of patients demonstrating mixed results. Sidani, et al. (2006) reported that patients who received care from NPs reported higher levels of physical and mental functioning and fewer role limitations due to physical health (Sidani, et al., 2006). Ritz, et al. (2000) found patients reported improved quality of life in patients treated by NPs. Tranmer & Parry (2004) found no difference for health-related quality of life between the NP and non-NP group.
The use of statistical analyses in several of the studies reviewed was limited. Two research studies (Knaus, et al., 1997; Mabrook & Dale, 1998) provided no statistical data to support their findings, which calls into question the validity of the findings and conclusions. These authors concluded that patients are satisfied with the care provided by NPs but provided no statistical evidence to support their results, limiting the ability to use the findings in support of the NP role.

The authors who used descriptive comparative studies performed a variety of statistical tests. Chang, et al. (1999), Reveley (1998), Rhee & Dermyer (1995), and Rudy, et al. (1998) used a combination of frequency, means, and t-test to analyze their data. Rudy, et al. and Chang, et al. also used analysis of variance to describe and analyze their finding. The conclusion that outcomes, tasks, and activities performed by NPs are similar to resident physicians are consistent and appear reliable (Chang, et al.; Rudy, et al.). Chang, et al. and Rudy, et al.’s research used internal validity controls of matching and random assignment in their designs. These findings are considered valid and reliable based on the methods used for the study. The results of the research studies with supporting statistical data support the findings of positive outcomes of patient groups, including patient satisfaction. These studies offer support for the role of the NP, but since they were completed in specific sites, their findings can only be generalized to those sites. In addition, if the characteristics of the patients who see a NP are different from the population in general, the findings can only be generalized to people with similar characteristics.

The most rigorous methodology in the research reviewed for outcomes in acute care was an experimental design (Carroll, et al., 2007; Ritz, et al., 2000; Tranmer &
Parry, 2004). These studies were thorough in their description of the purpose, the selection of study participants, the intervention, outcomes measures, and statistical analysis. The findings from these studies support the impact that NPs have on patient care. The populations studied in these studies were patients with breast cancer, CABG surgery, and MI, in the hospital and after hospital discharge. One study was performed on patients in Canada (Tranmer & Parry). The outcomes studied were quality of life, uncertainty, unplanned contact with the hospital, symptoms distress, patient satisfaction, and participation in cardiac rehabilitation. Some conflicting findings have been noted.

Three studies used retrospective designs to measure the impact of introducing NPs into specific practice sites (Dahl & Penque, 2001; Miers, 2002; Sarkissian & Wennberg, 1999). These studies evaluated data over a long period of time, which may detract from the validity of the findings. Outcome measures such as mortality, length of stay, and re-admission rates may naturally change over time because of advances in treatment or changes in patient care that occur during that time (such as introduction of critical pathways).

It should be noted that 8 of the 28 (28.5%) studies reviewed for acute care outcomes were studies that were performed outside of the U.S.; in Canada, the U.K., or Australia. These studies were not useful when determining the effects of NPs on patient care or for the selection of appropriate outcomes of NPs in the U.S. Educational preparation of NPs in countries outside of the U.S. may be different than in the U.S. Chang (1999) noted that NPs were often RNs with experience in a particular specialty area. Additionally, health care systems outside of the U.S. may have different issues related to patient care and the use of NPs.
The research discussed in this review examined the outcomes of NP care in hospital settings. These settings included inpatient units, outpatient departments, surgical departments, intensive care units, emergency departments, and care in the immediate post-hospital discharge period. The acute care facilities have been located in urban teaching hospitals, community hospitals, and rural hospital settings. Studies describing care activities of NPs in hospital EDs, outpatient departments, and inpatient units noted that NPs often provide care for patients who are younger and less acutely ill (Blunt, 1998; McCaig, et al., 1998; Mills, et al., 1998; Rudy, et al., 1998), while other identified NPs provided care to older, sicker patients (Knaus, et al., 1997; Lambing, et al., 2004; Mills & McSweeney (2005). These finding have implications for selection of outcomes in the proposed study. Patients in hospitals are generally acutely ill and NPs are responsible for providing care to this population. Selection of appropriate outcomes was an important consideration of this study.

There was limited use of conceptual frameworks for evaluation of effectiveness of NPs in the research reviewed. None of the investigations of NPs in hospital EDs used a conceptual model. Four studies reviewed in the hospital or immediate post-discharge period used conceptual models (Carroll, et al., 2001; Carroll, et al., 2007; Jensen & Scherr, 2004; Ritz, et al., 2000). Each study that used a conceptual model used a different one. The models used were related to role implementation (Carroll, et al., 2001; Carroll, et al., 2007) or outcomes selection (Jensen & Scherr, 2004; Ritz, et al., 2000). Mitchell, et al. (1998) proposed a conceptual framework for evaluating the effectiveness of care in acute care settings. Development and testing of this framework would provide a structure
for research that evaluates the components of the NP role and the effects on appropriate outcomes (Mitchell, et al.).

Limited focused investigations of outcomes for patients hospitalized for high frequency, high cost conditions who are cared for by NPs reflect the newness of the role as NPs move into acute care facilities. Individual studies were conducted in a wide variety of patient care areas, including general medical, neurosurgery, neurology, oncology, intensive care, and cardiac areas. A small number of the studies reviewed used strong methodology (Carroll, et al, 2007; Ettner, et al., 2006; Cowan, et al., 2006; Ritz, et al., 2000; Tranmer & Parry, 2004), but different patient populations and outcomes were used.

An additional finding related to the literature reviewed includes the lack of definition of NPs. Studies evaluating the role of the NP in primary (Lenz, et al., 2004; Mundinger et al., 2000; Venning, et al., 2000) or acute care (Blunt, 1998; Carroll, et al., 2007; Chang, et al., 1999; Cowan, et al., 2006; Dahle, et al., 1998; Ettner, et al., 2006; Mabrook & Dale, 1998; McCaig, et al, 1998; Mills, et al, 1998; Ritz, et al, 2000; Sakr, et al., 1999; Sakr, et al., 2003) did not identify the educational preparation or specialty (family, geriatric, adult, acute care) of the NPs involved. Other studies provided a definition of the term NP or APN that included ACNPs (Jensen & Scherr, 2004; Hoffman, et al., 2005; Miers; 2002; Rudy, et al., 1998; Sarkissian & Wennberg, 1999; Sidani, et al., 2006), FNP or ANP (Knaus, et al., 1997), ANP (Counsell & Gilbert, 1999), NPs or CNS (Dahle & Penque, 2001), ANPs or GNPs (Lambing, et al., 2004), CNS (Carroll, et al., 2001), and CNS or ACNP (Tranmer & Parry, 2004).
The Miers (2002) study is the single research study identified in the literature investigating the impact of NPs on outcomes for patients hospitalized for CABG. This study used a convenience sample of patients from one hospital using retrospective and prospective data. The outcomes selected may not reflect outcomes appropriate to measure NP outcomes. Additionally, changes in length of stay and cost may be due to naturally occurring changes in health care over time.

Nurse Practitioner Roles

Theoretical Literature

Role development for advanced practice nursing begins with a specialized education specific to the chosen role and continues with implementation of the role after graduation (Brykczynski, 2005). Acquisition of the NP role requires developing competence in theoretical and technical knowledge and skills (Brykczynski). All educational programs for NPs include domains of practice and core competencies that have been developed and defined by the National Organization of Nurse Practitioner Faculties [NONPF], (2006). The domains include management of patient health/illness, the NP-patient relationship, teaching-coaching function, professional role, managing health care delivery systems, monitoring and ensuring the quality of health care practice, and providing culturally sensitive care (NONPF). Implementation of the NP role often differs according to the area of specialization and practice site (Miller, 2001).
The role of the NP in acute care settings has been described as functioning in the role of the APN or as a physician extender (Callahan, 1996; Kleinpell-Nowell, 1999). NPs who work in acute care settings may function in a variety of roles and may have education in one of the NP specialties; including Family Nurse Practitioners (FNP), Adult Nurse Practitioners (ANP), and Acute Care Nurse Practitioners (ACNP) (Cole & Ramirez, 2000; Woods, 1998). NPs that practice in acute care often practice in collaboration with physicians (Shah, 1997).

**Empirical Literature**

The empirical literature reviewed focused on research that investigated the role and education of NPs in acute care settings. Role function of the NP, patient characteristics, and staff acceptance were measured in outpatient units (McCaig, et al., 1998), hospital emergency departments (ED) (Cole & Ramirez, 2000; Cole & Ramirez, 2002; Mills & McSweeney, 2005), hospital in-patient units (Jensen & Scherr, 2004; Knaus, et al. 1997; Lambling, et al., 2004; Rudy, et al., 1998), and in post-hospital care (Carroll, et al., 2001). The NP role outcome studied in the post-hospitalization period was role activities (Carroll, et al., 2001). Additionally a group of studies were conducted to describe the education and clinical practice of acute care nurse practitioners (ACNP) (Kleinpell, 1997, 1998, 1999, 2005; Kleinpell-Nowell, 1999). The studies are presented in order of out-patient department, emergency department, and in-patient hospital units, and general practice description; from the oldest to the most recent.
McCaig, et al.’s (1998) research, which was previously described in this literature review included a description of NP role functions in hospital out-patient departments. The NP/PA group ordered diagnostic tests and provided education and counseling to patients more frequently than the MD group.

Cole and Ramirez (2000) surveyed 96 NPs in 24 states working in hospital emergency departments to describe the type of patients they see and the frequency of activities, procedures performed as part of the NP role. Seventy-two NPs responded to the questionnaire that indicated that they performed 71 activities and procedures that often required on the job training. NPs also reported that they saw all types of patients in the ED; emergent, urgent, and non-urgent conditions.

Cole and Ramirez (2002) described the characteristics of 113 NPs practicing in hospital emergency departments (ED). Data were collected from the Resource Directory of Nurse Practitioners in Emergency Care. The findings of the study indicated that the majority of NPs (69.9%) were educated as FNPs, with the second highest group educated as ANPs (11.5%).

Mills and McSweeney’s research (2005), also previously discussed in this chapter, included a component on the patient population and practice patterns of NPs. Findings were that NPs saw 5.76 million hospital ED patients over four years in one hospital emergency department with a variety of patient problems. The most frequent problems were musculoskeletal, respiratory, and general complaints. NPs ordered medications for 75% of patients seen.

Knaus, et al. (1997) investigated the work activities, time engaged in activities, and quantity of patients seen at one hospital. These NPs were educated as FNPs and
provided care in both in-patient and out-patient settings of the hospital. NPs were found to spend most of their time providing direct patient involving activities which included: performing history and physical examinations; ordering and interpreting diagnostic studies, medications, treatment; coordinating care, and educating patients and families; consulting; and performing procedures. Other activities included administrative duties such as developing policies and procedures, committee meeting, and learning the system. NPs also engaged in educational activities with nursing and medical students, and for professional development.

Jacobson, et al. (1998-1999) used qualitative exploratory methodology using grounded theory to define the scope of practice, care coordination activities, prescriptive authority, test ordering practices, referral rates, costs associated with practice, and autonomy of NPs and PAs in a managed care hospital environment. This research described NPs and PAs as performing a wide range of patient care functions with a high level of autonomy; however, the NP and PA role within an institutional setting depended on physician acceptance.

Sidani, et al. (2000) conducted a descriptive study with a qualitative component to identify the scope and model of practice of ACNPs. A convenience sample of 57 ACNPs, employed at 11 hospitals in Canada was used. The scope of practice results indicated that the participants functioned as advanced practice nurses and combined nursing and medical functions. The ACNPs provided direct patient care, ordered and interpreted diagnostic studies, initiated medical treatments, and prescribed medications. Other roles assumed by the ACNPS were management, education, and research.
Carroll, et al. (2001) performed a qualitative study to describe the activities of three APNs (all CNSs) for 44 elderly patients after discharge for a myocardial infarction (MI). Patients were called once weekly to provide support to the selected participants. The APNs documented their patient interactions using a log. Themes were then identified using a recommended method. The themes were providing patient education, validation/feedback, encouragement/support, and problem solving.

Jensen & Scherr (2004) studied NP role activities, procedures performed, and the satisfaction of NPs themselves and other health professionals with the NP role in one hospital cardiac surgery intensive care unit (ICU). The purpose of this descriptive research was to evaluate the impact of a newly implemented ACNP in a cardiothoracic surgery ICU (CTICU). The NP’s primary role was found to be to provide direct care (73%) and the least common activity was consultation (2%). The NP performed 16 different clinical procedures regularly, with chest tube removal having the most frequency (4-8 times/day). The NP rated herself as very satisfied with the role, and she felt most confident at performing direct patient care and least confident in selecting diagnostic tests and determining non-cardiac medical diagnoses. Other health care providers (n = 34; 37.7% response rate) rated the NP on role process and outcomes using a 5-point Likert scale from 1 (changed for the worse) to 5 (changed for the better). Health care respondents rated the NP as having the greatest impact on continuity of patient care and collaboration among caregivers. NPs were also rated as changing patient outcomes for the better and preventing complications. This study is limited to the evaluation of one NP in one hospital department and a low provider response rate, though the results may inform the individual facility about the acceptance of the NP role.
Lambing, et al.’s research (2004), previously described in the review of the literature included a research component about NP care activities related time spent documenting patient progress and performing literature reviews for hospitalized geriatric patients. The NP group spent 28% of its time documenting progress notes \( (p = .011) \), while the resident group spent more time performing literature reviews \( (p = .008) \).

Kleinpell conducted several studies and a 5-year longitudinal study to describe the roles and practice profiles of ACNPs using a survey questionnaire (Kleinpell, 1997, 1998, 1999, 2005; Kleinpell-Nowell, 1999). The sample for each year was obtained from ACNPs scheduled to take a national certification exam. Kleinpell’s (1997) original study explored the role of the ACNP. Participants included 125 (93% response rate) ACNPs from 18 states and the District of Columbia. Work settings were identified as hospitals, clinics, and urgent care centers. The role components identified were primarily conducting histories (93%) and physical exams (95%), writing orders (94%), rounding (86%), performing procedures (82%), initiating transfers (75%), obtaining consultations (70%), and writing discharge summaries (70%). Less frequently performed procedures were case managing inpatients (24%), performing needle thoracentesis (11%), performing research (6%), and performing stress tests (3%). Follow-up studies were conducted. Kleinpell (1998) surveyed 384 respondents to examine aspects of the ACNP role. ACNPs practiced in tertiary care, secondary care, primary care, and home health. The major role components were managing patient care, interacting with families, discharge planning, and teaching. Other job responsibilities included administrative, teaching, research, program development, department projects, and staff education (Kleinpell, 1998). Additional research surveyed ACNPs to continue to describe the
evolution of practice (Kleinpell, 1999, 2005; Kleinpell-Nowell 1999). Sample sizes ranged from 740 (Kleinpell, 1999) to 437 (Kleinpell, 2005). The research indicated that ACNPs practice sites continued to expand to clinical settings, specialty practices, occupational health, and other areas (Kleinpell, 2005). The primary role responsibility continued to be direct patient care (Kleinpell, 2005). Other role responsibilities included administrative, teaching, research, program development, quality assurance, and department projects (Kleinpell, 2005).

**Summary of NP Role**

The research reviewed focused on research related to role implementation for NPs practicing in hospital outpatient departments, emergency departments, in-patient units, and post-discharge. The primary role functions described by NPs in the literature reviewed were direct patient care and patient education/counseling. It was also noted that NPs do not necessarily practice in sites congruent with their education.

**Conclusions**

The settings of the research reviewed for patients receiving care from NPs varied widely and included hospital emergency departments, hospital outpatient departments, general medical floors, specialty units, and the post-hospitalization period. In order to identify the value of NP care, it is imperative that continued research be conducted with all populations and areas where NPs practice. As NPs move into acute care settings, the
research evaluating role function activities and role implementation should follow. Gaps in the literature reviewed included the lack of a full description of the NP role in the hospital setting. A richer description of the NP role is needed that identifies how NPs provide a unique contribution to quality patient care. There was also limited selection of outcome measures for patients in acute care. Additional research that measures patient-centered outcomes and preferences is needed for specific populations with commonly occurring complex health care conditions; such as CABG surgery.

The Knaus, et al. (1997) study was an initial step in describing the changing role of the NP in acute care. As NPs move into acute care institutions to provide care to a more specialized group of patients in in-patient units and emergency departments, it is important to establish the how NP roles may affect quality of care for patients. The studies reviewed used a variety of hospital departments and methods with some conflicting findings. In order for the findings to be applied appropriately in acute care, additional research is necessary to confirm previous authors work.

The role of the NPs who provides care for patients hospitalized for CABG surgery is currently not known. CABG surgery is a high-frequency procedure resulting in high costs (American Heart Association, 2007; Cardiac Surgery in PA, 2007). Studies have examined quality of care of NPs, measured as effectiveness, in primary care and hospital settings. As NPs move in acute care settings, it is important to evaluate the role of that group and the impact that may occur on quality of care.

In order to determine the value of NPs, quality and cost must be considered (Kleinpell-Nowell & Weiner, 1999; Sidani & Irvine, 1999). Quality is one outcome that can be measured using measures of effectiveness that include clinical complications,
functional status, patient knowledge, and patient satisfaction. In order to determine the value of an NP, quality and cost should both be considered as two variables that determine outcomes (Sidani & Irvine). Ford (1997) suggested that additional outcomes need to be discovered that address the value of advanced nursing practice. Ford also argues that NPs need to “move beyond comparing its nursing expertise with the expertise of physicians, residents, and other medical personnel” (p. 90). Kleinpell-Nowell and Weiner (1999) noted that the traditional measures of mortality and morbidity may not adequately identify the contributions of NP care and other outcomes measures should be studied. Ingersoll, McIntosh, and Williams (2000) also identified additional outcomes that are sensitive to outcomes of advanced practice nurses, regardless of their practice site. These outcomes include patient satisfaction with care and quality of life.

This study will describe the role of the NP as an active participant in the care of patients with CABG surgery. Patient preferences and patient-centered outcomes that will be measured are patient perceptions of health related quality of life (HRQOL) and patient satisfaction. Condition specific outcomes are the occurrence of adverse events, cost, mortality, and hospital re-admission. These outcome measures are included in the theoretical model used as the framework for this study. The QHOM and study variables are presented in Figure 2.1.
Chapter 3

Methodology

This chapter describes the research design, study setting, sample, instruments and measures, procedures, human rights protection, and method of statistical analysis. The primary aim of this descriptive, correlational study was to describe the perceptions of patients post coronary artery bypass surgery (CABG) surgery related to health related quality of life (HRQOL) and satisfaction when nurse practitioners (NPs) were active participants in care. Secondary aims were to: describe the outcomes for patients post CABG surgery when care was provided by NPs; and to describe the role of the NP in the care of CABG patients. Patient perceptions reflect an important aspect of patient centered care. The choice to use hospitals where the NP played a major role in the active care of CABG patients was based on the assumption that NPs make an important contribution to the health care team, which ultimately influences patient perceptions and outcomes. Perceptions of patients HRQOL and satisfaction were measured using two questionnaires. Outcomes after CABG surgery were measured as: adverse events; pulmonary, urinary tract, and wound infections; cost of care; mortality; and hospital re-admissions within 30 days of discharge for the CABG surgery. The role of the NP was described using a questionnaire. Hospitals, as the setting for this research, were selected to provide information about patients who had CABG surgery, when care was given by NPs. The type of hospitals included were mid to large community hospitals in northeastern (NE), central, or southeastern (SE) PA, without Magnet designation, and
that utilized a NP for the direct care of CABG patients. Hospitals were selected based on similar characteristics for number of beds, number of CABG procedures performed, and similar processes of care in order to limit confounding variables in the study.

**Research Design**

The study was conducted using a descriptive single-group design of patients who had CABG surgery and received care from NPs during their hospitalization. A descriptive design was selected for the following reasons:

1. A description of the phenomenon of interest can be identified using this design.

2. It is difficult to impose control on human subjects undergoing treatment for current disease.

3. Patient illness, admissions, and provision of care are naturally occurring phenomenon in acute care facilities.

4. The expense of conducting a study using an experimental design would be prohibitive (Babbie, 2004; Kerlinger & Lee, 2000).

Primary data collection was used for all variable measures. Data were collected using the QualityMetric ShortForm-36 version-2 (SF-36v2) questionnaire for perceptions about HRQOL (Appendix A), the Patient Judgment System (PJS) questionnaire (Appendix B) for perceptions of satisfaction, a Chart Review Tool (Appendix C), a NP Survey (Appendix D) for role and care activities of NPs. Additional information about
each hospital where the patients were recruited was obtained using a Hospital Survey (Appendix E).

The investigator described the perceptions of patients post CABG surgery related to quality of life and satisfaction when care was provided by NPs. Outcomes for patients post CABG surgery, when care was provided by NPs and the role of the NP for the care of CABG patients were also measured. Patient perceptions were measured using a survey questionnaire for HRQOL (SF-36v2) and patient satisfaction (PJS-20). Outcomes were measured as adverse events, cost of care, mortality, and hospital re-admissions within 30 days of discharge for the CABG surgery. The role of the NP was measured using a survey questionnaire. A descriptive study is a form of observational design (Shadish, Cook, & Campbell, 2002). A short-term longitudinal, descriptive design was used because the research questions were exploratory in nature. Information about patient perceptions and the outcomes of patients who had CABG surgery when care was provided by an NP is not well established. Descriptive designs are used to describe variables and phenomenon of interest and are often performed when there is no control of an independent variable, variables are described but not manipulated, and to describe current practices as they occur within a natural health care setting which has high applicability for clinical practice (Burns & Grove, 2003; Kerlinger & Lee, 2000; Shadish, et al. 2002)

NPs were recognized as an additional important member of the health care team who may influence the system of care through interventions used for patients undergoing CABG surgery. It was anticipated that the role of the NP was to provide a unique combination of services that may have included: direct patient care, diagnosis and
treatment of illness, monitoring patient status, and education of patients, families and staff (Kleinpell, 1997, Kleinpell, 1999). The use of this provider may have enhanced continuity of care with a potential for the identification of complications of CABG or treatments at an earlier point in time. All participants in the study received the usual traditional medical and nursing care in addition to the care provided by the NPs. Traditional care was the standard care provided by physicians, nurses, and ancillary providers during hospitalization for CABG. The type of services provided by NPs was identified using a survey questionnaire. The NP survey documented the roles that each NP implemented at their respective hospital.

This design is congruent with the theoretical framework of the study. The Quality Health Outcomes Model (QHOM) was used as the framework for this research. The QHOM describes a reciprocal relationship between the system, intervention, client, and outcomes (Mitchell, et al., 1998). The patient was one variable and a component of the client variable of the QHOM. The client incorporates variations of health, demographics, and disease risk factors. The NP variable was part of the system, with role activities as part of interventions of care in the QHOM (Mitchell, et al.). Patient perceptions and outcomes were part of the outcome variable of the model. Outcomes included a combination of traditional outcomes and patient perceptions. The investigator generated Chart Review Tool was used to measure patient characteristics as well as the outcomes adverse events, cost of care, hospital readmissions, and mortality. Patient perceptions about HRQOL and satisfaction were measured using two survey questionnaires; QualityMetric’s SF-36v2 (n.d.) and the PJS-20 (Hays et. al, 1991).
The following limitations have been identified:

1. The findings from this research cannot be generalized to all patients who received care from NPs as part of the health care team while hospitalized for CABG surgery.

2. This study is a descriptive design thus models of causality cannot be tested.

3. There may be other unidentified factors that influence patient outcomes.

**Setting**

The setting for this research was the hospital. A criterion based or purposive sample was used to select hospitals from a list of facilities that performed CABG surgery in PA. The criteria for hospital inclusion were hospitals that were: 1) located in NE, SE, or central PA; 2) bed size was greater than 100 beds and less than 475 beds; 3) performing CABG surgery for at least two years; 4) utilize NPs for direct patient care of CABG patients; and 5) perform more than 100 and less than 400 CABG procedures annually. Exclusion criteria for hospital selection were hospitals with: 1) current magnet status; 2) resident physicians who provide care for CABG patients; 3) more than 475 bed and 4) located in urban areas.

Criterion-based sampling was used because it allowed the researcher to meet the predetermined criterion that was identified as important to the research (Patton, 2002); patients who received care from NPs while hospitalized for CABG surgery in non-urban, mid to large size community hospitals in NE, central, or SE Pennsylvania (PA) that did not have Magnet designation. Hospitals with CABG programs were identified first and
then it was determined if NPs provided direct care for CABG patients. Hospitals with
CABG programs were identified using two sources, the PA Department of Health (DOH)
(PA DOH Health Directory, n.d.) and the Pennsylvania Health Care Cost Containment
Council (PHC4) (Cardiac Surgery, 2007). A list of all hospitals in PA was obtained from
the PA DOH. The DOH provided information about each hospital in PA including
location and the number of licensed beds. PHC4 was used to identify hospitals that
performed CABG surgery for at least two years, number of CABG surgeries annually,
and surgical statistics for each hospital and cardiac surgeon. Mid to large sized non-urban
hospitals that performed CABG surgery were then identified using the information from
the PA DOH and PHC4.

There were sixty hospitals identified in PA that performed CABG surgery during
the hospital recruitment period of June to August 2008. Forty-two of these hospitals were
located in NE, central, and SE PA (PA DOH Health Directory, n.d.; Cardiac Surgery,
2008). Nineteen of the forty-two hospitals appeared to meet the criteria for size, location,
and number of surgeries performed annually. Each hospital that met the inclusion criteria
for location and size was contacted through the Office of Medical Administration and
then the Chief of Cardiothoracic (CT) Surgery. A return phone call was received from
twelve (63.1%) of the nineteen hospitals by either a medical administrator or the Chief of
CT surgery. Additional information was obtained about each of the hospitals during that
phone conversation. One facility no longer performed cardiac surgery and one facility
was re-organizing their cardiothoracic program. Four of the hospitals identified that they
utilized other health care personnel for the care of cardiac surgical patients, including a
combination of physician assistants and/or resident physicians. Two hospitals identified
that NPs were only used for out-patient post-operative care of CABG patients. Two hospitals (Hospital A and Hospital B) that responded identified that they used NPs as the sole provider, in addition to the cardiac surgeon for the care of patients having CABG surgery. These two hospitals and the Chief of CT Surgery at each hospital expressed an interest in participating in the research. Hospital A and B provided the setting for the research after Institutional Review Board approval was received.

Hospital A is a 297 bed community hospital in NE PA that performed 204 CABG surgeries in 2006 using three cardiac surgeons (Cardiac Surgery, 2008) and one NP (Personal Communication, Hospital A). Hospital B is a 330 bed community hospital in NE PA that performed 232 CABG surgeries in 2006 using one cardiac surgeon (Cardiac Surgery) and one NP (Personal Communication, Hospital B).

Two non-urban, community hospitals were selected since it was more likely that resources and patient populations in these hospitals were similar. This was used as a method of decreasing the variability that may occur in hospital structure, system (process), and patient characteristics. Community hospitals in non-urban setting have been described as having similar resources, patients with similar risk patterns and comparable number of procedures performed annually (Cardiac Surgery, 2008; PA DOH, n.d.). Hospitals that provide cardiac surgical services have similar resources and staffing patterns necessary to meet standard Department of Health (DOH) and Joint Commission on Accreditation of Healthcare Organizations (JCAHO) requirements. The technology for CABG procedures has little variation from one facility to the next (PA DOH, n.d.). Patients that are eligible for these procedures have common medical diagnoses and co-morbidities. CABG surgery is performed on patients who have coronary artery lesion(s)
related to atherosclerosis that are not treatable through other medical therapies (Eagle, et al., 1999; Eagle, et al., 2004). Common co-morbidities associated with diseases of the heart are diabetes, hypertension, and coronary artery disease (Eagle, et al., 1999, Eagle, et. al., 2004; Cardiac Surgery, 2007; PHC4, 2002). Individual hospitals may vary on the number of procedures performed annually (PA DOH, n.d.), number of open heart procedures that are not CABG surgery, and high risk surgeries performed (Cardiac Surgery, 2008). Hospitals that are large or urban were more likely to perform a greater number of CABG procedures annually and perform surgery on patients considered to be at higher risk for complications (Cardiac Surgery, 2008).

Hospitals that perform CABG surgeries in PA have an average size of 375 staffed beds (Pennsylvania Department of Health [PA DOH], n.d.) and perform an average of 197.8 CABG only procedures annually (Cardiac Surgery, 2008). The typical community hospital in NE, central, and SE PA was identified as having an average of 307 staffed beds (PA DOH) and performs an average of 182.4 CABG only procedures annually (Cardiac Surgery). Community hospitals are described as short-term, non-Federal general hospitals with 100 to 500 beds (Houchens, Pavlov, Whalen, Prentakis, & Elixhauser, 1996).

A hospital administrative representative at each facility completed the Hospital Survey to provide additional information that was used to identify similarities or differences about hospital characteristics and system of care for CABG surgery patients. Hospital size, location, patient population and number of CABG surgeries performed annually appeared comparable during the enrollment period. Patients in participating hospitals were cared for in two areas during their hospitalization for CABG surgery. The
typical system described was that patients are admitted to each hospital CTICU for up to
24 hours after surgery and then moved to the CT step-down unit for an additional four to
five post-operative days; or the remainder of their hospital stay (Personal
Communication, Hospital A; Personal Communication, Hospital B ). Nursing and
medical care provided in these areas followed established written protocols using
standing orders that delineated a standard of care. Additionally, nurse-patient ratios were
consistent across institutions with nurse-patient ratios 1:1 in the CTICU and 1:3 to 1:4 on
the step-down units.

Sample

Sample Selection

Patients having CABG surgery in hospitals that agreed to participate comprised
the study sample. Inclusion criteria for individual participant selection were: 1) at least 18
years of age; 2) received CABG only surgery; 3) read and spoke English. Patients were
excluded from participation in the research if they: 1) were less than 18 years of age; 2)
had any other surgical procedure at the same time as the CABG surgery; 3) did not read
and speak English. A total of 152 patients were screened for sample selection; 65 at
Hospital A and 87 at Hospital B. A total of 98 patients met the inclusion criteria; 44 at
Hospital A and 54 at Hospital B. A total of 91 (93.8%) patients agree to participate and
were enrolled in the study; 40 at Hospital A and 51 at Hospital B. Patients were excluded
from the study for the following reasons: 1) N = 31 had cardiac valve surgery; 2) N = 19
had valve surgery at the same time as the CABG procedure; 3) N = 2 did not read or speak English; 4) N = 2 were prisoners in correctional facilities.

**Sample Size**

The sample size of 86 was determined a priori using power analysis software G*Power (Faul, Erdfelder, Lang, & Buchner, 2007) and through consultation with a biostatistician in the Statistical Consulting Center at Penn State University. The analysis was calculated for multiple and logistic regression using power of .80, an alpha level at .05, using a two-tailed test with a small effect size. Power is influenced by effect size, significance level, and sample size (Cohen, 1988). Power was set at .80 to reduce the risk of a Type II error which would result in falsely accepting the null hypothesis (Cohen, 1988; Munro, 2001). A Type II error would conclude that there is no statistical significance difference between groups, when in fact a difference does exist (Cohen). The significance level (alpha) for the study was set at .05, which is considered acceptable to increase confidence and decrease the incidence of a Type I error (Cohen; Babbie, 2001). A significance level set at .05 would indicate that the probability of the results occurring by chance, or from a sampling error that is no more than five percent.

The effect size represents the extent to which the phenomenon exists in the population of study and the sensitivity of the instruments in detecting the phenomenon (Cohen 1998; Munro, 2001). Cohen assigns numerical values to quantify a qualitative measure of effect with 0.2 indicating a “small effect” and 0.8 indicating a “large effect.” The larger the effect size posited, the smaller the sample size required to detect the
proposed effect. A small effect size of 0.2 was selected to identify the appropriate group size for variables that have been demonstrated to have a small effect size based on previous studies using similar study designs. Mortality, adverse events, and cost were estimated to have a small effect size (Cardiac Surgery, 2008; Cowan, et al., 2006), while HRQOL, and satisfaction have been identified as having moderate to large effect size (Sidani, et al., 2006). It was determined that a minimum of two hospitals were needed to obtain the sample size of 86 participants for a data collection period of three months. This number was based on the participating hospitals performing an average of 54 CABG only procedures during a three month period (Cardiac Surgery, 2008).

**Institutional Review Board (IRB)**

IRB approval was received from The Office for Research Protection at Penn State University (IRB#29801, Appendix F) following IRB approval at Hospital A and Hospital B. Support for the research was initially obtained from the Chief of CT surgery at each hospital. Each hospital’s IRB was contacted, the required forms and information submitted, and IRB approval received. IRB application was then made to The Office for Research Protections at Penn State University with documentation of IRB approval from each hospital. An application for expedited review was submitted to Penn State with the required information about: background, purpose of the research, hypotheses, methodology, data analysis, and written consent for participants, implied consent for NPs. The required forms for protected health information (HIPAA) and involvement of patients in research were also completed. HIPAA regulations required that all participants
are aware of how their protected health information will be kept confidential. Once all participant data was collected, participants were assigned a code number and all identifiers were removed from the research data set. The original patient name and medical record number were only accessible to the researcher and others as required by law. All original patient and hospital information will be kept in a locked file cabinet in a locked office. All individual and hospital identifiers have been removed from this report.

**Enrollment**

Patient enrollment was initiated following Institutional Review Board (IRB) approval from Hospital A, Hospital B and then Institutional Review Board Approval from The Pennsylvania State University (IRB #29801; Appendix F). Patients were identified at each hospital that agreed to participate in the study. Patients who were scheduled for surgery (elective procedures) were identified through the hospital admission office or department of surgery scheduling office. Patients who underwent urgent or emergent procedures were identified through the department of surgery as they were scheduled for the surgery or through the cardiothoracic (CT) step-down unit where they were admitted awaiting the surgery. All potential participants were approached by the researcher either during their pre-operative period or post-operatively in the CT step-down area. Each identified patient was given information about the research using a verbal script (Appendix G). Patients who expressed an interest in participating were then screened using pre-determined questions to identify if they met the inclusion criteria (Appendix H). Once it was determined that patients met inclusion criteria, and they
agreed to participate, written informed consent was obtained by the researcher (Appendix I). This procedure for enrolling patients was performed every third day at each hospital over a period of 12 weeks until there were 91 participants enrolled in the study. The enrollment procedure was terminated at that time due to time constraints. This number of participants allowed for the assessment of all outcome measures.

**Data Collection Procedures**

Data were collected from participating hospitals, NPs, and individual patient participants. A hospital questionnaire that was created for this study was used to confirm hospital characteristics and describe the hospital’s process of care. An administrative representative at each hospital and the nurse manager of the CT intensive care unit (CTICU) and CT step-down unit at each hospital was contacted through a telephone call and given information about the hospital survey. An appointment was made with each individual, consent was obtained (Appendix J), and the hospital survey was completed at the in-person meeting by the principal investigator (PS). This information was used to identify any potential difference in hospital process of care or extraneous variables that may have influenced participant outcomes.

NP data were obtained using the Nurse Practitioner Survey (Kleinpell, 2005). There was one NP at each hospital that practiced in the cardiac surgery program. The NP was identified through medical administration and the Chief of CT Surgery. Role function was assessed to identify how NPs participated in direct patient care for patients hospitalized for CABG surgery. The researcher contacted each NP, set up an
appointment, obtained consent (Appendix K), and the survey was completed during that meeting.

Participant outcome data were collected from three sources; a chart review and two questionnaires. The Chart Review Tool was developed for this study by the principal investigator. (Appendix C). The chart review for each participant was completed by the P.I. approximately six weeks following participant’s hospital discharge for the CABG surgery. This time frame was selected to allow for completion and coding of the medical record, calculation of costs, and the identification of hospital readmissions within 30 days of discharge for the CABG surgery. The medical record of each participant was reviewed for the CABG hospitalization and any re-admission to the emergency department, observation unit, or in-patient unit. More specifically, the information for the surgical hospitalization included the following: participants’ date of birth; gender; presence of diabetes, classification of the priority of the surgical procedure; type of surgical procedure; occurrence of adverse events; and in-patient mortality. Hospital records were then reviewed for any subsequent emergency department or in-patient records for 30 days following hospital discharge.

Hospital A had standard paper medical records. Charts were obtained at Hospital A by requesting the medical record. Once the participant’s date of discharge was known, a request for records related to re-admissions was made. Hospital B had electronic medical records. The electronic medical record for the surgical hospitalization was accessed for review. Once the date of discharge was known, the electronic system was searched for records related to re-admissions. All paper and electronic searches were conducted using the participants’ medical record number.
Cost information was also recorded on the Chart Review Tool. This information was obtained from each hospital business office approximately four weeks following participant discharge from the hospital. The business office manager was contacted at each hospital, a list of participants account number submitted, and hospital charges (costs) were obtained.

The surveys used to measure patient perceptions of HRQOL and patient satisfaction were the SF-36v2 (QualityMetric, n.d.) and the Patient Judgment System-20 (PJS-20) (Hays, et al., 1991). The surveys instruments were given to each patient as part of a packet that they received as they were scheduled for discharge from the CT step-down unit of each hospital or packets were mailed to participants if they preferred. The packet included the following: written instructions for completing the surveys; the two surveys; a stamped, self-addressed envelope for survey return; a pencil; and a small financial incentive of two dollars. A note was attached to the survey forms with information on how to complete the surveys and the date when the surveys should be completed and returned to the researcher.

Dillman’s (2007) Tailored Design Method was used as the method for survey distribution and in order to promote a high response rate. Dillman described elements needed to achieve a high return rate for surveys. These include: “(1) a respondent-friendly questionnaire, (2) up to five contacts with the questionnaire recipient by first-class mail, (3) inclusion of return envelopes with real first-class stamps, (4) personalization of correspondence, and (5) a token financial incentive” (p. 150). The five contacts were used as needed. All participants received a personalized letter with their discharge packet. This letter provided a reminder about the research and a date to return
the surveys. All participants also received a post card reminder one week prior to due date of the survey. A second post card was sent ten days after the questionnaires were due as needed and replacement questionnaires were mailed as needed.

**Outcome Measures**

Adverse events, cost of care, mortality, and hospital re-admissions are frequently used measurements of outcomes of care (Cardiac Surgery, 2008; Institute of Medicine [IOM], 2001; McLaughlin & Kaluzny, 1999). These indicators have been demonstrated to be effective valid measures of quality care (Larrabee, Engle, & Tolley, 1995; McLaughlin & Kaluzny). Post-operative pneumonia, urinary tract infections, wound infections are recognized adverse events associated with cardiac surgery (DeJong & Morton, 1998; Eagle, et al., 1999; Eagle, et al., 2004; PHC4, 2002). Re-admission rates were the percent of patients who were re-admitted to the hospital for complications related to the CABG surgery within thirty days of hospital discharge (PHC4 Technical Notes 2007; Zitser-Gurevich, Simchen, & Galai, 1999). Re-admission to the same hospital where the CABG surgery was performed within 30 days of discharge was identified using chart reviews. However, it was a limitation that potential missing data on readmission occurred as participants may have been re-admitted to hospitals other than the one where the surgery was performed if they resided closer to another hospital. Data about mortality and occurrence of adverse events were captured through the participant’s medical records. All participants’ medical records were reviewed using the Chart Review Tool. Cost of care data was obtained through the business office of
participating hospitals. Complete accuracy of the data cannot be guaranteed since this information is dependant on appropriate documentation by hospital staff and coding in medical records. Reported hospital charges were used. It is anticipated that mean costs will not be affected by a small percentage of coding errors with an N = 91.

Survey data are considered to be a reliable source of information about a phenomenon of interest (Babbie, 2004). The issues associated with survey data include sources of error; sampling error, coverage error, measurement error, and non-response error (Dillman, 2007; Fowler, 2001). These problems are minimized when standardized questionnaires are used (Babbie; Dillman), sample size is adequate, and return rates are strong (Dillman). Two reliable and valid instruments were used in this study, with a return rate of 82.9%.

**Instruments**

Five separate instruments were used in this study. An investigator designed Hospital Instrument (Appendix E) was used to confirm that hospitals met inclusion criteria and to describe the units where patients receive care following CABG surgery. The Nurse Practitioner Survey (Appendix D) was used to measure the NP variable and describe the role of the NP for the care of CABG surgery patients. Participant outcomes were measured using three instruments: an investigator developed Chart Review Tool (Appendix C); The SF-36v2 survey (Appendix A) for patient perceptions of HRQOL (QualityMetric, n.d.); and the PJS survey (Appendix B) for patient perceptions of satisfaction (Hays, et al., 1991). Permission was obtained from the authors for use of the
Nurse Practitioner survey and PJS survey (Appendix L). A licensing agreement was obtained from QualityMetric for the HRQOL survey with permission for use of the survey for one year (Appendix M). A summary of the variables, instruments, and timing of measures is presented in Table 3.1.

Table 3.1. Summary of Variables, Instruments, and Timing of Data Collection

<table>
<thead>
<tr>
<th>Variable</th>
<th>Instrument</th>
<th>Timing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nurse Practitioner</td>
<td>Nurse Practitioner Instrument (NP)</td>
<td>During enrollment</td>
</tr>
<tr>
<td>Adverse Events</td>
<td>Chart Review</td>
<td>6 weeks post hospital discharge</td>
</tr>
<tr>
<td>Cost of Care</td>
<td>Chart Review Tool</td>
<td>6 weeks post hospital discharge</td>
</tr>
<tr>
<td>Perceptions of Health Related Quality of Life</td>
<td>Short Form-36, version 2 (SF36v2)</td>
<td>4 week post hospital discharge</td>
</tr>
<tr>
<td>Mortality</td>
<td>Chart Review Tool</td>
<td>6 weeks post hospital discharge</td>
</tr>
<tr>
<td>Perceptions of Patient Satisfaction</td>
<td>Patient Judgment System (PJS)</td>
<td>4 weeks post hospital discharge</td>
</tr>
<tr>
<td>Re-admission to the hospital</td>
<td>Chart Review Tool: 1 item</td>
<td>6 weeks post hospital discharge</td>
</tr>
</tbody>
</table>
Hospital Instrument

The Hospital Instrument (Appendix E) is a survey that was used for the following: to confirm that hospitals met inclusion criteria; describe individual hospital unit characteristics; describe the process of care used for CABG patients; identify if NPs were used in the care of CABG patients; and to identify possible extraneous variables that may influence patient outcomes. Hospitals that appeared similar were selected as the research setting as a method of increasing homogeneity of the study participants. The instrument was also used to describe the individual units where patients received care during hospitalization for CABG surgery to identify any potential confounding variables that may have influenced patient outcomes. Some factors that may influence CABG surgery outcomes include nurse-patient ratio, the use of standard orders, and the use of other health care providers such as resident physicians or physician assistants for the care of patients while hospitalized for CABG surgery.

Nurse Practitioner Instrument

A survey was used to measure the NP variable (N = 2). It was necessary to describe the type of direct and indirect contact that each NP had with patients having CABG surgery. The survey used was the Nurse Practitioner Survey (Kleinpell, 2005) (Appendix D). This survey was developed for the research using questions adopted from a longitudinal study of Acute Care Nurse Practitioners (ACNP) (Kleinpell, 2005)
The survey identified demographic, educational, and role implementation data for the two NPs who worked with patients who had CABG surgery at the participating hospitals. The frequency of care activities was also obtained. NPs working in acute care have been described as either being primarily responsible for the medical management of patients or having a combination of responsibilities which include medical management of patients, administrative responsibilities, staff and patient education, quality assurance and program development (Kleinpell, 2005; Sidani, et al., 2000). One case study of an NP who worked in a hospital’s cardiac surgery department described the role of the NP as focusing on preoperative assessment and education, postoperative management, and postoperative follow-up care (Callahan, 1996). One NP was identified as working in the CT surgery department at each hospital. An appointment was made with each NP and the survey was completed by the NP at the in-person meeting.

**Chart Review Instrument**

The Chart Review instrument (Sweeney, 2008) (Appendix C) was used to collect information about participant demographics, the presence of co-morbidities, urgency of surgery, operative information, occurrence of adverse events, re-admission data, and cost of care. The Chart Review Tool was developed for the proposed research and was based on the Cardiovascular Data Set Tool, initially developed by and used by Hospital A since July 2001 (Personal Communication, Hospital A, July 21, 2005). The Cardiovascular Data Set Tool was developing using the recommendations of The Society of Thoracic
Surgeons (STS) and The Pennsylvania Hospital Cost Containment Council (PHC4). STS is a not-for-profit educational organization representing surgeons who perform surgical procedures of the chest. STS provides its members with practice guidelines for CABG procedures and has developed a national database for quality improvement and research in cardiac surgery (Society of Thoracic Surgeons, n.d.). PHC4 is an independent state agency that was formed to provide information to health care providers and the public about quality health care and costs of care in PA (PHC4, n.d.). All hospitals in PA that perform CABG surgery are required to submit data to the PHC4 (PHC4, n.d.).

The demographic data collected included identification of those variables known to influence CABG outcomes (Eagle, et al., 1999; Eagle, et al., 2004; PHC4, 2002; PHC4 Technical Notes, 2007). These variables included: age; gender; priority of surgery; type of surgical procedure; and presence of diabetes (O’Connor, et al., 1991; PHC4 Technical Notes, 2007; Zitser-Gurevich, et al., 1999). Surgical priority was classified as: elective (non-urgent or scheduled), urgent (less than 72 hours from event), or emergent (less than 12 hours from event). Diabetes is a co-morbid condition known to increase the risk of CABG surgery (Eagle, et al., 1999; Eagle. et al., 2004; PHC4, 2002). Operative data collected included the number of bypasses and type of bypass performed. Post-operative information was collected about adverse events. Adverse events were defined as the occurrence of wound, pulmonary, or urinary tract infections during the post-operative period or within 30 days of discharge from the hospital. Patient mortality and hospital readmissions within 30 days of discharge for the CABG procedure were also measured using this tool.
Health Related Quality of Life (HRQOL)

Description

The tool used for perceptions of HRQOL was the second version of Ware and Sherbourne’s 36 item Short Form Questionnaire (SF-36v2) (Appendix A) (QualityMetric, n.d.). A licensing agreement for the use of the instrument was obtained from QualityMetric (Appendix M). The SF-36 is a 36-item survey that measures functional health and well-being, physical health, and mental health (Ware & Sherbourne, 1992). The original SF-36 was developed to survey health status during the Medical Outcomes Study (MOS) using 23,000 patients from physical and mental health practices in three large cities (Ware & Sherbourne). The MOS looked at 40 health concepts to establish a generic measure for health using eight health concepts perceived as the most important (Ware & Sherbourne). The SF-36v2 measures the same dimensions of health as the original version and includes: physical functioning, role limitation due to physical health (role-physical), bodily pain, general health perceptions, vitality, social functioning, role limitations due to emotional problems (role-emotional), and mental health. Two summary scores, physical health and mental health are also measured (Ware & Sherbourne). Higher individual scores and summary scores on the survey indicate higher levels of quality of life. Normative data was developed for the original SF-36, allowing individual health domain and summary scored to be compared to other individuals in the general population. The SF-36v2 is the result of several improvements of the questionnaire. The improvements included better instructions, simplified wording, five-level response...
categories, and updated norms (Ware, Kosinski, Bjorner, Turner-Bowker, Gandek, & Maruish, 2008).

Validity

Validity for the SF-36 vs has been well established. Construct validity, content validity and criterion validity have been documented for the original HRQOL SF-36 tool (Gandek, Sinclair, Kosinski, & Ware, 2004; McHorney, Ware, Rogers, Raczek, & Lu, 1992; Ware, et al., 1980; Ware, et al., 2008; Ware & Sherbourne, 1992). Construct validity was originally established for the SF-36 by linking theory on quality of life with selected HRQOL dimensions, multi-trait scaling, and convergence and discrimination (Ware, et al., 1980). Construct validity was then examined for the SF-36v2 through factor analysis, convergent and discriminant validation, and known-group comparisons (Ware, et al., 2008). Factor analysis demonstrated a strong association ($r = .88$) for the physical functioning scales with the physical component of health and a weak association ($r = .14$) with the mental health component. The mental health functional scales showed a strong association ($r = .93$) with the mental health components of the tool and a weak association ($r = .16$) with the physical components (Ware, et al., 2008). Multi-trait scaling was used to evaluate discriminant validity. Items were considered to discriminate when they correlated higher with the hypothesized health domain scale, rather than with one of the other domains (Ware, et al., 2008).

Content validity of the original SF-36 was established by a review of the literature on HRQOL and content expert evaluation. Face validity was also established. Criterion-
related validity studies were not originally performed since “previously validated measures of the relevant construct and agreed-upon criterion measures were not available” (Ware, et al., 1980, p. 5). Ware, et al. chose to use construct validation, face validity, and content validity studies in the absence of criterion-related validity.

**Reliability**

Reliability of the SF-36 was initially established with internal-consistency reliability, test-re-test, and reproducibility (Ware, et al., 1980). Gandek, et al., (2004) then evaluated internal consistency and reliability of the SF-36 in Medicare patients. Internal consistency reliability was 0.83 to 0.93 for the eight scales and 0.94 and 0.89 for the summary measures. The SF-36 has been used extensively in research since it’s’ development (Pettiti, 1998; Ware, et al, 1980). Reliability of the SF-36 is well established with a Chronbach’s Alpha of > 0.80 for all scales (Pettiti, 1998). The improvements in the second version of the survey resulted in internal consistency scores of 0.83 to 0.95 (Ware, et al., 2008). The SF-36 is capable of detecting small differences (QualityMetric, n.d). The SF-36v2 can be self administered to persons age 14 and older and completed in 5-10 minutes (SF-36v2 Health Survey). This instrument has been used in both genders and has been adapted for use in more than 60 languages (SF-36v2 Health Survey). Cronbach’s alpha results for this study were .760 (Social Function) to .894 (Role Physical). While the Cronbach’s alpha scores in this research are lower on the SF-36v2 for HRQOL than reported scores (Ware, et al., 2008), alpha scores greater than .70 are considered acceptable in social science research (Nunnally & Bernstein, 1994).
Participants in this research may have either not understood the questions related to social functioning or answered in a way considered to be socially desirable.

The SF-36 has also been used to measure quality of life in cardiac patients in a variety of settings. This instrument has been used to measure HRQOL in patients undergoing cardiac rehabilitation (Sledge, Ragsdale, Tabb, & Jarmukli 2000); in patients with implantation of an internal defibrillator for the treatment of heart disease (Carroll & Hamilton, 2005); and in patients after CABG (Bradshaw, Jamrozik, Gilfillan, & Thompson, 2005; Hunt, Hendrata, & Miles, 2000; Kiebzak, Pierson, Campbell, & Cook, 2002; Tranmer & Parry, 2004). Johansson, Agnebrink, Dahlstrom, and Brostrom (2004) performed a literature review and found that the SF-36 was the most frequently used instrument (n=13) to measure HRQOL in patients with heart failure between 1995 and 2002.

**Scoring**

All scoring was performed using software for the SF-36v2 purchased from QualityMetric. The scoring for this instrument was based on individual raw scores and transformed scores for the eight components of health and two summary scores. The eight components of health are listed as physical functioning (PF), role-physical (RP), bodily pain (BP), general health (GH), vitality (VT), social functioning (SF), role-emotional (RE), and mental health (MH). The two summary scores for the survey are for physical health and mental health. All individual scores were transformed to raw scores of 0-100 using the scoring software, with higher scores indicating a higher quality of life.
(Ware, et al., 2008). Norm based scores developed for use with the SF-36v2 were also calculated. Norm based scores were developed using a linear T-score transformation with a mean of 50 and standard deviation of 10 (Ware, et al., 2008). Norm based scoring allows for the comparison of results across studies, similar age population, and individuals with known heart disease.

**Patient Satisfaction Instrument**

**Description**

The instrument used for perceptions of patient satisfaction was the short form of the Patient Judgement System (PJS) (Appendix B) (Hays, et al., 1991). The original version of the PJS was developed in 1989 by the Hospital Corporation of America and consisted of 68 items (Nelson, Hays, Larson, & Batalden, 1989). The original tool measured ten components of satisfaction including admissions, daily care, information, nursing care, physician care, auxiliary staff, living arrangement, discharge, billing, and total process (Nelson, et al.). The shortened version of the PJS was developed in 1991 in response for the need to develop “brief and psychometrically sound, patient based measures of quality” (Hays, et al., 1991, p. 661). The shortened version, PJS-20, is a 20 item questionnaire measuring the original ten dimensions of quality of hospital care.

The 20-item questionnaire consists of 20 questions on a 5 point Likert scale with item scores ranging from (1) excellent to (5) poor. A sixth choice for each question includes a (6) “does not apply” response. One additional “allegiance” (intent to return)
question deals with a patient’s intent to use the hospital in the future with Likert-type responses ranging from (1) definitely yes to (4) does not apply; with a fifth response of (5) does not apply.

Validity

Content validity of the original instrument was established by a review of the literature on patient satisfaction, content expert evaluation, focus groups, and content analysis of patient answers to questions about hospital quality (Nelson, et al., 1989). Additionally, patient evaluations of hospital quality were compared to employees’ evaluations with correlations found to range from $r = 0.52$ (physician care) to $r = 0.87$ (allegiance). Item discriminant validity was evaluated with multi-trait scaling (Nelson, et al.). Validity of the PJS-20 was established by comparing patient judgments and employee ratings of care. The correlations ranged from $r = 0.48$ to $r = 0.88$ (Hays, et al., 1991). Correlations between the original and shorter version of the questionnaire were also established with $r = 0.39$ (billing) to $r = .76$ (total process) (Hays, et al.).

Reliability

Reliability of the original PJS instrument was established at the patient and hospital level for each dimension of satisfaction with testing on 5,625 patients from 32 rural and urban hospitals in five states. The most common medical diagnosis of respondents was acute ischemic heart disease (Nelson, et al., 1989). Patient level
reliability ranged from Cronbach’s alpha of 0.86 to 0.97, with hospital reliability measured at 0.70 (for billing) to 0.89 (living arrangements) (Nelson, et al, 1991). Test-retest reliability demonstrated small changes in average hospital scores over a period of 3 months (mean = 1.6 to 2.5).

Reliability of the PJS-20 was established based on the results of a stratified random sample of 5,619 patients discharged from 32 hospitals in five states. The original version of the tool was shortened to 20 items using Goodnight’s maximum R-squared improvement procedure (Hays, et al., 1991). The shortened form was then compared to the longer version of the questionnaire with Cronbach’s alpha scores ranging from a low of 0.65 (living arrangements) to a high of 0.92 (total process). The individual Cronbach’s alpha for all measures of quality, with the exception of living arrangements (alpha = 0.65) and auxiliary staff (alpha = 0.75), were 0.83 to 0.92. The overall Cronbach’s alpha for the PJS-20 in this study were .708 (living arrangements) to .946 (admission).

Researchers have evaluated the PJS tool. McDaniel and Nash (1990) developed a compendium of instruments that measured patient satisfaction with nursing care. Twenty-one instruments were evaluated for length, psychometrics, administration length, and use of subscales. McDaniel and Nash concluded that the PJS included satisfaction with nursing care, had established psychometrics with formal procedures described in the literature, and is a reliable and valid tool. More recently, Perneger, Kossovsky, Cathieni, Floria, and Burnhand (2003) compared four patient satisfaction questionnaires for acceptability and patient perceptions using a sample (n = 2,877) of patients discharged from a Swiss hospital during one month. The return rate for the survey was 70.3%, resulting in analysis of 2,023 questionnaires. There were no statistically significant
differences for return rates, mean scores, or acceptability for all questionnaires. The PJS-20 was found to be acceptable, have the least number of irrelevant item questions, and took the least amount of time to complete (Perneger, et al.).

**Scoring**

Scoring for this questionnaire was based on summative responses of the items for each aspect of patient satisfaction; admission, daily care, keeping informed, nurses, doctor, other hospital staff, living arrangements, discharge, and billing. Likert type scales for these items range from 1 (excellent) to 5 (poor). A sixth choice (does not apply) was also a choice for these items. When a participant indicated that an item did not apply, the score for that item was not included in the calculation for the item or for the summary score. One additional item intended to measure “allegiance” had four choices; 1 (definitely yes) to 4 (definitely no). A “does not apply” (5) was also available for selection for the allegiance item (Hays, et al., 1991). Individual scores were transformed to range from 0 to 100; with 0 indicating all poor responses and 100 indicating all excellent responses. Scores were recorded for individual areas and total satisfaction. The allegiance item raw score and transformed score for the allegiance item were both recorded. A separate total satisfaction score was calculated with the allegiance item excluded and then included. This was done to avoid over inflation of satisfaction scores since 71.4% of participants scored this item as “definitely will return” (1) or “probably will return” (2). Higher scores indicated higher levels of patient satisfaction.
Data Analysis

The Statistical Package for the Social Sciences (SPSS 16.0) was used to analyze all data. The primary method of data analysis was univariate to describe the sample, all variables, and check statistical assumptions. For the purposes of data analysis, ordinal measures obtained from scales were treated as interval level data. Ordinal data obtained on Likert scales are often considered approximate to interval level data (Kerlinger & Lee, 2000; Munro, 2001). Descriptive analysis techniques were determined by the level of data obtained (Table 3.2). Each research question was addressed individually. Data was further explored to identify the presence of relationships among the main variables in the research. Pearson’s Product Moment Correlations were performed for continuous variables, point-biserial for dichotomous variables with continuous variables, and phi coefficient for two dichotomous variables. Multiple linear regression was performed to explore the effects of study variables on perceived health related quality of life.
<table>
<thead>
<tr>
<th>Variable</th>
<th>Level of Measurement</th>
<th>Central Tendency</th>
<th>Variability</th>
<th>Symmetry</th>
<th>Kurtosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adverse Events</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pulmonary infection</td>
<td>Nominal</td>
<td>Mode</td>
<td>Frequency of categories</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Urinary tract infection</td>
<td>Nominal</td>
<td>Mode</td>
<td>Frequency of categories</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Wound infection</td>
<td>Nominal</td>
<td>Mode</td>
<td>Frequency of categories</td>
<td>Fisher’s skewness</td>
<td>Fisher’s kurtosis</td>
</tr>
<tr>
<td>Total Number of adverse events</td>
<td>Continuous</td>
<td>Mean</td>
<td>Range</td>
<td>Range SD</td>
<td></td>
</tr>
<tr>
<td>Cost of Care</td>
<td>Continuous</td>
<td>Mean</td>
<td>Range</td>
<td>Fisher’s skewness</td>
<td>Fisher’s kurtosis</td>
</tr>
<tr>
<td>HRQOL</td>
<td>Continuous</td>
<td>Mean</td>
<td>Range</td>
<td>Fisher’s skewness</td>
<td>Fisher’s kurtosis</td>
</tr>
<tr>
<td>Mortality</td>
<td>Nominal</td>
<td>Mode</td>
<td>Frequency of categories</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Patient Satisfaction</td>
<td>Continuous</td>
<td>Mean</td>
<td>Range</td>
<td>Fisher’s skewness</td>
<td>Fisher’s kurtosis</td>
</tr>
<tr>
<td>Re-admission within 30 days</td>
<td>Nominal</td>
<td>Mode</td>
<td>Frequency of categories</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>
Missing Data

Tabachnick and Fidell (2001) noted that there are no absolute guidelines to determine how much missing data can be tolerated; but that problems can be created if greater than 5% of the data is missing on a small data set. The researcher was able to obtain 100% of data from chart reviews. This was achieved through primary data collection using a Chart Review Tool performed for each participant. To avoid problems with missing data from the survey questionnaires, the researcher provided each participant with verbal instructions at the time of recruitment, written instructions at the time the surveys were given to each participant, and written instructions which were included in the packet that each participant received at the time of hospital discharge. Additionally, if participants required replacement surveys, written instructions were again included in their mailing. The scoring software purchased from QualityMetric was used to calculate missing item responses for the HRQOL questionnaire, the SF-36v2 if the respondent answered at least 50% of the items in a multi-item scale. The score for the missing item was based on the participant’s responses to other items using the half-scale rule, stating that the respondent’s average score can be substituted for the missing item (Ware, et al., 2008). This technique was used for five participants. The patient satisfaction questionnaires (PJS-20) and Chart Reviews were also evaluated for missing data, with none present.
Unit of Analysis

The unit of analysis for this study was at the individual level. This is at the level of the patient, rather than the hospital. It is important to distinguish the unit of analysis in order to avoid drawing invalid conclusions about the research findings (Babbie, 2004). The data were collected from individual patients who had CABG surgery at two hospitals that agreed to participate in the research. Data analysis was performed using data obtained from individual patients who received care from NPs during their hospitalization for CABG surgery. Findings are related to the individuals, rather than the hospitals.

Descriptive Statistics

Data obtained from the Chart Review Tool and the two questionnaires consisted of nominal, interval, and ratio level data. Descriptive statistics were used to describe the sample, all variables, and check the assumptions of statistical tests. Measures of frequency distribution, measures of central tendency, dispersion, symmetry, and kurtosis were used as appropriate for each variable. Table 3.2 summarizes the plan for analysis. Descriptive statistics were also used to identify if there was any difference between participants at the two hospitals for age, gender, presence of diabetes, and urgency of surgery. The description of the participants is discussed first for categorical variables; gender, diabetes, hospital, and surgical priority. The participant continuous variable for age is also presented. Participant outcomes categorical variables adverse events, mortality, and hospital re-admissions is also presented. The final description of outcomes
variables is for perceptions of satisfaction and perceptions of quality of life. Descriptive statistics for participants are presented in Table 3.3 and Table 3.4.

*Table 3.3. Descriptive Statistics for Participants’ Variable Age*

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>91</td>
<td>66.08</td>
<td>10.42</td>
<td>39.60</td>
<td>88.00</td>
</tr>
</tbody>
</table>

*Table 3.4. Participant Descriptive Statistics for Gender, Hospital, Surgical Priority, and Diabetes*

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>Male</td>
<td>62</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>29</td>
</tr>
<tr>
<td>Hospital</td>
<td>A</td>
<td>41</td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>50</td>
</tr>
<tr>
<td>Surgical Priority</td>
<td>Elective</td>
<td>26</td>
</tr>
<tr>
<td></td>
<td>Urgent</td>
<td>59</td>
</tr>
<tr>
<td></td>
<td>Emergent</td>
<td>6</td>
</tr>
<tr>
<td>Diabetes</td>
<td>No</td>
<td>48</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>43</td>
</tr>
</tbody>
</table>

Data were analyzed to measure the outcomes adverse events, mortality, hospital re-admission, and cost of care. Categorical outcomes are presented in Table 3.5 for Adverse Events, mortality, and hospital re-admission. The patient outcome cost was
analyzed (N = 91), with an average cost of $82,732.07 (SD 37,444.30) and a range for cost included a minimum of 42,727.99 and a maximum of 287,896.00.

Table 3.5. Descriptive Statistics for Outcomes Adverse Events, Mortality, Re-admission

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Respiratory Infection</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>81</td>
<td>89.0</td>
</tr>
<tr>
<td>Yes</td>
<td>10</td>
<td>11.0</td>
</tr>
<tr>
<td>Sternal Wound Infection</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>91</td>
<td>100.0</td>
</tr>
<tr>
<td>Yes</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>Urinary Tract Infection</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>83</td>
<td>91.2</td>
</tr>
<tr>
<td>Yes</td>
<td>8</td>
<td>8.8</td>
</tr>
<tr>
<td>Saphenous Vein Graft Infection</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>89</td>
<td>97.8</td>
</tr>
<tr>
<td>Yes</td>
<td>2</td>
<td>2.2</td>
</tr>
<tr>
<td>Hospital Mortality</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>90</td>
<td>98.9</td>
</tr>
<tr>
<td>Yes</td>
<td>1</td>
<td>1.1</td>
</tr>
<tr>
<td>Hospital Re-Admissions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>73</td>
<td>80.2</td>
</tr>
<tr>
<td>Yes</td>
<td>18</td>
<td>19.8</td>
</tr>
</tbody>
</table>

Scores for perceptions of satisfaction for all aspects of care, and total satisfaction are presented in Table 3.6. Total satisfaction with care was calculated with and without the allegiance (return) item since the majority of participants (73.6%, N = 67) indicated a
rating of one or two, for will definitely return or will probably return. High scores for this item inflate the total satisfaction score.

**Table 3.6. Descriptive Statistics for Perceptions of Satisfaction**

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Admission Procedure</td>
<td>68</td>
<td>79.78</td>
<td>22.13</td>
<td>.00</td>
<td>100.00</td>
</tr>
<tr>
<td>Total Care</td>
<td>73</td>
<td>82.81</td>
<td>16.97</td>
<td>50.00</td>
<td>100.00</td>
</tr>
<tr>
<td>Keeping the Patient</td>
<td>73</td>
<td>80.72</td>
<td>18.46</td>
<td>25.00</td>
<td>100.00</td>
</tr>
<tr>
<td>Informed</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nurse</td>
<td>73</td>
<td>83.33</td>
<td>20.01</td>
<td>37.50</td>
<td>100.00</td>
</tr>
<tr>
<td>Physician</td>
<td>73</td>
<td>82.29</td>
<td>19.76</td>
<td>25.00</td>
<td>100.00</td>
</tr>
<tr>
<td>Other Staff (Lab, IV)</td>
<td>73</td>
<td>79.47</td>
<td>18.79</td>
<td>16.60</td>
<td>100.00</td>
</tr>
<tr>
<td>Living Arrangements</td>
<td>73</td>
<td>72.22</td>
<td>20.58</td>
<td>25.00</td>
<td>100.00</td>
</tr>
<tr>
<td>Information at Discharge</td>
<td>73</td>
<td>76.79</td>
<td>19.65</td>
<td>25.00</td>
<td>100.00</td>
</tr>
<tr>
<td>Billing Procedure</td>
<td>57</td>
<td>66.97</td>
<td>24.71</td>
<td>25.00</td>
<td>100.00</td>
</tr>
<tr>
<td>Total Satisfaction</td>
<td>73</td>
<td>78.31</td>
<td>15.99</td>
<td>46.29</td>
<td>100.00</td>
</tr>
<tr>
<td>Raw Score for Return</td>
<td>73</td>
<td>1.35</td>
<td>.77</td>
<td>1.00</td>
<td>5.00</td>
</tr>
<tr>
<td>Satisfaction Total w/</td>
<td>73</td>
<td>79.63</td>
<td>15.23</td>
<td>46.66</td>
<td>100.00</td>
</tr>
<tr>
<td>Return</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note. Scores for perceived satisfaction (Patient Judgment System-20) were transformed to scores of 0 – 100. Higher scores indicate a higher satisfaction with the aspects of hospitalization. * Admission data was based on N = 68 and ** Billing data is based on N
All items had a “not applicable” choice. The Admissions scores and Billing scores reflect participants who indicated that admission or billing were not applicable.

**Table 3.7: Descriptive Statistics for Perceptions of Health Related Quality of Life**

<table>
<thead>
<tr>
<th>Role Component</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical Functioning (PF)</td>
<td>73</td>
<td>52.12</td>
<td>22.83</td>
<td>0</td>
<td>95</td>
</tr>
<tr>
<td>Role Physical (RP)</td>
<td>73</td>
<td>35.95</td>
<td>22.68</td>
<td>0</td>
<td>100</td>
</tr>
<tr>
<td>Bodily Pain (BP)</td>
<td>73</td>
<td>52.23</td>
<td>23.34</td>
<td>0</td>
<td>100</td>
</tr>
<tr>
<td>General Health (GH)</td>
<td>73</td>
<td>67.75</td>
<td>19.43</td>
<td>17</td>
<td>97</td>
</tr>
<tr>
<td>Vitality (VT)</td>
<td>73</td>
<td>49.23</td>
<td>20.38</td>
<td>0</td>
<td>81.25</td>
</tr>
<tr>
<td>Social Function (SF)</td>
<td>73</td>
<td>56.60</td>
<td>26.53</td>
<td>0</td>
<td>100</td>
</tr>
<tr>
<td>Role Emotional (RE)</td>
<td>73</td>
<td>65.35</td>
<td>31.31</td>
<td>1</td>
<td>100</td>
</tr>
<tr>
<td>Mental Health (MH)</td>
<td>73</td>
<td>71.98</td>
<td>19.32</td>
<td>15</td>
<td>95</td>
</tr>
<tr>
<td>Physical Score Summary</td>
<td>73</td>
<td>37.45</td>
<td>8.12</td>
<td>17.58</td>
<td>52.33</td>
</tr>
<tr>
<td>Mental Score Summary</td>
<td>73</td>
<td>46.71</td>
<td>11.18</td>
<td>18.77</td>
<td>63.41</td>
</tr>
<tr>
<td>Norm Based Scoring PF</td>
<td>73</td>
<td>36.90</td>
<td>9.59</td>
<td>14.9</td>
<td>54.9</td>
</tr>
<tr>
<td>Norm Based Scoring RP</td>
<td>73</td>
<td>31.88</td>
<td>8.92</td>
<td>17.7</td>
<td>56.9</td>
</tr>
<tr>
<td>Norm Based Scoring BP</td>
<td>73</td>
<td>41.94</td>
<td>9.86</td>
<td>19.9</td>
<td>62.1</td>
</tr>
<tr>
<td>Norm Based Scoring GH</td>
<td>73</td>
<td>45.52</td>
<td>9.25</td>
<td>24.3</td>
<td>62.5</td>
</tr>
<tr>
<td>Norm Based Scoring VT</td>
<td>73</td>
<td>45.54</td>
<td>10.19</td>
<td>20.8</td>
<td>61.5</td>
</tr>
<tr>
<td>Norm Based Scoring SF</td>
<td>73</td>
<td>38.86</td>
<td>11.67</td>
<td>13.2</td>
<td>58.9</td>
</tr>
<tr>
<td>Norm Based Scoring RE</td>
<td>73</td>
<td>39.71</td>
<td>14.56</td>
<td>9.2</td>
<td>55.9</td>
</tr>
<tr>
<td>Norm Based Scoring MH</td>
<td>73</td>
<td>48.37</td>
<td>10.91</td>
<td>16.2</td>
<td>61.3</td>
</tr>
</tbody>
</table>

Note. Scores for PF, RP, BP, GH, VT, SF, RE, MH, PCS, MCS range from 0-100, with higher scores indicating higher HRQOL for the individual component of HRQOL. Normative based scoring for all components of the HRQOL questionnaire are calculated with a mean of 50 and standard deviation of 10.
Perceptions of health related quality of life were calculated for all components and the two summary scores for physical health and mental health. Additionally, normative based scores were calculated. The description of these scores is presented in Table 3.7.

**Inferential Statistics**

Inferential statistics were used to explore relationships between the constructs of interest. Correlations were conducted to identify relationships between the main predictors; age, gender, presence of diabetes, surgical priority, and hospital with the main outcome variables; perceptions of HRQOL, perceptions of satisfaction, adverse events, cost, mortality, and re-admissions. Point-biserial correlations were performed for relationships between dichotomous and continuous variables; Pearson’s Product Moment correlation for relationships between continuous variables; and phi coefficient for relationships between two dichotomous variables.

A limited number of multiple regression analyses were conducted based on the study constructs and relationships that were identified in the correlations for health related quality of life bodily pain, mental health, and physical functioning. Regression uses correlations between variables to develop a prediction equation (Munro, 2001). Multiple regression is used when there are more than one correlation between a group of predictor variables and one dependent variable. It can also be used to explain the interrelationships among variables and identify how much each of the variables contributes to the variance of the dependent variable (Munro, 2001).
The data were examined to determine if the statistical assumptions of multiple regression were met. Inferential statistics assume a normal distribution (Munro, 2001), though it has been demonstrated that “regression analysis is generally robust in the face of departures from assumptions” (Pedhazur, 1997). The assumptions for regression include using a representative sample, normally distributed interval/ratio level variables, Y distribution scores with approximately equal variability (homoscedasticity), and a linear relationship between X and Y (Munro, 2001).

The data were determined to approximate normality. Normalcy was determined by several methods; examining for skewness, looking at histograms, and examining means, medians, and modes (Tabachnick & Fidell, 2001). Since regression assumes the responses of the dependent variables are normally distributed, several methods were used to identify if this assumption was met. Histograms were reviewed for the presence of outliers. An outlier was considered to be a data point distinct from the rest of the data (Pedhazur, 2001). Outliers were removed and the regressions were rerun to identify any significant changes in the $r^2$ (Tabachnick & Fidell). Results of less then -2 or greater than 2 are significant for autocorrelation (Tabachnick & Fidell). Autocorrelation was not a problem in this study.

To check the assumption of homoscedasticity, a plot of standardized residuals was examined. The residual is the difference between the actual and the predicted score (Munro, 2001). The plot should appear with the actual scores clustered close to the imagined line (Munro). Homoscedasticity indicates that the variance of error is the same across all levels of the predictor variables (Pedhazur, 2001). The assumption of homoscedasticity was met in this study.
The assumption of linearity was evaluated using scatter plots and partial regression plots. These plots were visualized to identify outliers in residuals. Partial regression plots were used to identify the relationship of the dependent variable with each independent variable. The presence of a linear or curved pattern identified the relationship that existed between the dependent and independent variables (Pedhazur, 2001). Linear relationships were found between all interval/ratio level variables. No major outliers were identified.

There were other factors considered in this study for using regression for the analysis of data. One factor considered was the use of a criterion based sample, rather than a random sample with inferential statistics. Huck noted that “inferential statistics can be used with non-probability samples, extreme care must be used in generalizing results from the sample to the population” (2008, p. 109).

The equation for the regression model is:

\[ Y = B_0 + B_1 X_1 + B_2 X_2 + B_3 X_3 + B_4 X_4 + B_5 X_5 + E \]

where:

- \( Y \) = Outcome indicator
- \( B_0 \) = Intercept
- \( B_1 X_1 \) = age
- \( B_2 X_2 \) = gender
- \( B_3 X_3 \) = diabetes
- \( B_4 X_4 \) = priority of surgery
- \( B_5 X_5 \) = Hospital
- \( E \) = Random error

A similar model was used for all outcomes.

The primary objective of the data analysis was to describe perceptions of patients post CABG surgery related to health related quality of life and patient satisfaction when NPs were active participants in care. A secondary purpose was to describe the occurrence
of adverse events of patients post CABG surgery when care was provided by NPs. Outcomes measured were the occurrence of adverse events (pulmonary, urinary tract, and wound infections), cost of care, mortality, and re-admissions to the hospital within 30 days of hospital discharge. A description of the NP role was also performed.

Analysis of data was primarily descriptive to answer the research questions. Additional analysis was used to exploration of the data for relationships between the study variables using bivariate and multivariate analyses.

Research Questions

Research Question 1:

What is the perception of patients related to health related quality of life post CABG surgery when NPs are active participants in care? To answer this question HRQOL scores on the eight sub-scales and two summary scores resulted in continuous level data. This data is described using means, percents, standard deviation, and range.

Research Question 2:

What is the perception of patients related to satisfaction post CABG surgery when NPs are active participants in care? To answer this question satisfaction scores on the ten components of satisfaction, and one summary score resulted in continuous level data. This data is described using means, percents, standard deviation, and range.

Research Question 3:

What is the occurrence of outcomes for patients post CABG surgery when NPs are active participants in care? To answer this question, the occurrence of the outcomes
adverse events, cost, mortality, and re-admissions were described. Adverse events, mortality, and re-admissions were measured at the nominal level. Frequencies for these outcomes were described. Cost and total number of adverse events were measured at the continuous level. Mean, standard deviation, and range were calculated.

_Research Question 4:_

What is the role of the NP for the care of patients who have CABG surgery? The survey used to measure the role of the NP resulted in nominal and continuous level data. To answer this question frequencies and ranges were used to describe nominal level data. Continuous level data were described using means, standard deviations, and ranges.

**Secondary Data Analysis**

Data was further analyzed for relationships between the study variables. Point-biserial, phi coefficient, and Pearson’s Product Moment correlations were used as appropriate for the level of the data. Multiple linear regression was used to examine relationships of study variables on perceived health related quality of life. Each research question was addressed individually.

**Summary**

A descriptive, correlational study was performed to answer four research questions, three of the questions related to the patient, and one question was related to the
NPs in the study. Data were primarily analyzed using descriptive statistics. Additional statistics were used to explore the relationships among the major variables of the study.
Chapter 4

Data Analysis

Introduction

This chapter presents the results of the statistical analyses used to describe the perceptions of patients related to health related quality of life and patient satisfaction post coronary artery bypass grafting (CABG) surgery when Nurse Practitioners (NP) were active participants in care. In addition, results of the statistical analyses used to describe the outcomes of patients post CABG surgery when care was provided by an NP are presented. The outcomes measured were adverse events, cost of care, mortality, and hospital re-admission. Descriptive statistics that identify averages, and spread, are reported. A description of each hospital and NP is also presented.

Description of Hospitals

Two hospitals were used as the setting for this research. The criterion-based sample required the identification of mid to large size non-urban community hospitals that were not designated as Magnet institutions in northeastern (NE), central, or southeastern (SE) Pennsylvania (PA) that performed CABG surgery and used NPs for the direct care of patients hospitalized for CABG surgery. Hospitals were identified first, and then patients receiving CABG surgery in those hospitals were the study participants. Nineteen hospitals that met the inclusion criteria for size and location were contacted.
with return calls received from eleven facilities (57.8%). Six of these hospitals were excluded for the following reasons: one hospital no longer performed CABG surgery (9%), one was re-organizing the cardiothoracic surgery program (9%), and four hospitals used other health care personnel such as physician assistants and/or resident physicians (36%). One hospital, Hospital A, expressed an early interest in participating in the research met the inclusion criteria. Hospital A identified that there was an NP used for the direct care of patients during their hospitalization for CABG surgery. A second hospital that met inclusion criteria was then identified. This hospital was located in a county adjacent to the location of Hospital A. This second hospital also identified that a NP participated in the care of patients hospitalized for CABG surgery. It was determined that two hospitals would be needed to complete enrollment and data collection over a three month period.

The two hospitals were similar on the characteristics of size, location, number of CABG surgeries performed annually, and use of an NP for the care of patients while hospitalized for CABG surgery. Hospital A is a 297 bed general community hospital in PA that performed 204 CABG procedures in 2008 (Personal Communication, Hospital A, January 21, 2009). There were three cardiac surgeons who performed the surgeries at the time of data collection for this study. Hospital A has had the cardiothoracic surgery program for 12 years. Hospital B is a 330 bed general community hospital in a county adjacent to Hospital A. Hospital B has had the cardiothoracic surgery program for 20 years and performed 246 CABG procedures in 2008 Personal Communication, Hospital B, January 18, 2009). There was one cardiac surgeon who performed all CABG procedures during the time of data collection for this study.
The process of care used at Hospital A and Hospital B were also similar. Patients were admitted to each hospital on the morning of the scheduled surgery for elective procedures. The NP at each facility performed the pre-operative assessment, instituted patient teaching, and implemented standing orders for these patients. Patients who had an emergent or urgent procedure were admitted to a cardiothoracic (CT) step-down unit prior to their surgery, where they were evaluated by the NP. The NP at each hospital implemented standing orders and performed patient and family teaching. All patients were placed in a specialty CT intensive care unit for one day post-operatively, and if stable were then transferred to the CT step-down unit. The nurse to patient ratio in the CTICU at both hospitals was 1:1, while the nurse to patient ratio in the CT step-down unit was 1:3 (Hospital A) or 1:4 (Hospital B). Additionally, all patients received a required education program (either video or classroom) related to diet, activity, and follow-up instructions prior to their hospital discharge by hospital staff. NPs provided written and verbal discharge instructions for all patients.

**Nurse Practitioners**

Two nurse practitioners (NP) participated in the care of patients receiving CABG surgery at the hospitals that were used as the setting for this study; one at each facility. Each NP completed the NP survey. The NP at Hospital A (NP A) has been employed by the hospital for eight years and works solely in the department of cardiothoracic (CT) surgery. NP A holds a post-Masters certificate as an acute care nurse practitioner (ACNP), is board certified by the American Nurses Credentialing Center (ANCC), and
has been an NP for ten years. The NP at Hospital B (NP B) has been employed by the cardiac surgeon for eleven years. NP B holds a Master of Science degree as a Family Nurse Practitioner (FNP), is board certified by the ANCC, and has been an NP for 15 years. Each NP is credentialed through the hospital’s Department of Medicine.

Each NP described their primary role functions, daily activities, and the process of care for patients having CABG surgery. Clinical patient care represents 80% of both NPs practice, though individual care activities varied. NP A described the primary role as patient educator, monitoring patient progress by rounding daily on all patients, reviewing patient diagnostic test results daily, and reviewing charts to assure that standard orders were implemented. NP A did not write orders, but initiated standard orders. NP A noted that a phone call was placed to all patients one week after they are discharged from the hospital to evaluate any problems at that time.

NP B described the primary role as direct care provider and educator for patients and families. NP B initiated standard orders but also wrote individual patient orders as needed. NP B noted that she also maintained a clinical practice with the CT surgeon, with a responsibility for seeing all patients one to two weeks post-surgery in an out-patient cardiac clinic. During that follow-up visit, she reviewed an x-ray, checked all wounds, reviewed medications, and provided education about diet and cardiac rehabilitation. Other activities performed by NP B included follow-up phone calls with all patients after they return home and trouble shooting any problems that arose. NP B also reported performing additional care for patients after the CABG surgery, including removal of invasive devices prior to patient discharge.
NP role descriptions and functions performed were examined as a part of this analysis. The activities are summarized in Table 4.1. The NPs (100%) made follow-up phone calls to patients after they were released from the hospital (N = 91). The number of times per week that NPs spent seeing patients ranged from 60 to 80 per week, with a mean of 69.01 per week (SD = 10.01). The number of times per week spent performing patient history and physicals ranged from 0 hours to 10, with a mean of 5.49 hours (SD = 5.00). The number of times per week spent ordering lab and/or x-ray studies ranged from 5 hours to 15 hours per week, with a mean of 10.49 times weekly (SD = 5.00). NPs coordinated patients’ hospital discharge plans 5 to 10 times per week, with a mean of 7.75 hours per week (SD = 2.50). The number of times the NP monitored patients’ progress ranged from 20 hours to 60 per week, with a mean of 41.54 (SD = 20.05). NPs collaborated with health care team members 20 times weekly (M = 20; SD = 20) and initiated specialty consultations ranged from 0 to 2 times weekly, with a mean of 1.10 time per week (SD = 1.00). The hours spent per week examining and cleaning wounds ranged from 5 hours to 20 hours, with a mean of 13.24 hours per week (SD = 7.50). The number of hours per week NPs spent performing and draining incisions ranged from none to once weekly, with a mean of 0.55 times per week (SD = .50). NPs performed patient and/or family teaching ranged 5 to 20 times per week, with a mean of 13.24 (SD = 7.50). NPs spent performing nursing in-service education from zero to one per week, a mean of 0.55 per week (SD = .50). Finally, the number of times NPs spent initiating quality assurance ranged from 0 to 5 times per week, with a mean of 2.25 time weekly (SD = 2.50).
Table 4.1. Number of Times Activities Performed by Nurse Practitioners Weekly

<table>
<thead>
<tr>
<th>Activity</th>
<th>Mean</th>
<th>SD</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seeing Patients/ Week</td>
<td>69.01</td>
<td>10.01</td>
<td>60</td>
<td>80</td>
</tr>
<tr>
<td>Perform History and Physical/ Week</td>
<td>5.49</td>
<td>5.00</td>
<td>0</td>
<td>10</td>
</tr>
<tr>
<td>Orders Lab/X-Ray Studies/Week</td>
<td>10.49</td>
<td>5.00</td>
<td>5</td>
<td>15</td>
</tr>
<tr>
<td>Coordination of Discharge Plans/Week</td>
<td>7.75</td>
<td>2.50</td>
<td>5</td>
<td>10</td>
</tr>
<tr>
<td>Monitoring Patient Progress/Week</td>
<td>41.54</td>
<td>20.05</td>
<td>20</td>
<td>60</td>
</tr>
<tr>
<td>Week Collaborating with Members of the Health Care Team/Week</td>
<td>20.00</td>
<td>0.00</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>Initiates Specialty Consultations /Week</td>
<td>1.10</td>
<td>1.00</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Examines and Cleans Wounds /Week</td>
<td>13.24</td>
<td>7.50</td>
<td>5</td>
<td>20</td>
</tr>
<tr>
<td>Performs Incision and Drainage /Week</td>
<td>.50</td>
<td>.50</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Performs Patient/Family Teaching /Week</td>
<td>13.24</td>
<td>7.50</td>
<td>5</td>
<td>20</td>
</tr>
<tr>
<td>Perform Nursing In-Service Education /Week</td>
<td>.55</td>
<td>.50</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Initiates Quality Assurance/ Week</td>
<td>2.25</td>
<td>2.50</td>
<td>0</td>
<td>5</td>
</tr>
</tbody>
</table>

Participant Sample Description

The criterion-based sample consisted of 91 patients who received CABG surgery in Hospital A and B. A total of 152 patients were identified by the hospitals as being scheduled for cardiac surgery or as having had their cardiac surgery; 65 at Hospital A and
87 at Hospital B. Each patient was screened using a series of questions in order to
determine if they met enrollment criteria (Appendix H); with 98 patients screened who
met the criteria; 44 at Hospital A and 54 at Hospital B. Patients did not meet enrollment
criteria for the following reasons: 31 had valve surgery; 19 had valve surgery at the same
time as the CABG procedure; 2 did not speak or read English; and 2 were prisoners in
correctional facilities. Ninety-one patients (92.7%) who met enrollment criteria agreed to
participate in the research, 40 from Hospital A and 51 from Hospital B. Seven patients
(7.3%) who met the inclusion criteria declined to participate in the research; 4 from
Hospital A and 3 from Hospital B. There were five males and two females who declined
to participate in this study.

A total of 91 chart reviews were performed and 91 sets of surveys were
distributed. Chart reviews were 100% complete with no missing data. A total of 73 of 91
participants (82.9%) returned both surveys. This percent was calculated based on 88 of
91 participants who were eligible to return completed surveys at one month post hospital
discharge. Three participants who were enrolled in the study died within 30 days of
hospital discharge. The surveys were reviewed for completeness. Five surveys for
HRQOL had missing items; one with two missing items and four with one missing item.
Missing items scores were calculated for these items using the recommendations of
QualityMetric (Ware, et al., 2008). Ware, et al. recommended using the half-scale rule to
calculate a missing item when the respondent answered at least 50% of the items in a
multi-item scale. The half-scale rule is considered the most robust method of treating
missing data when the SF-36v2 is used (Ware, et al.). The half-scale rule states that the
respondent’s average score can be substituted for the missing item based on answers to
other items in the same category (Ware, et al.). The surveys with missing items were included in the data analysis. All patient satisfaction surveys were complete. The data presented in this report was based on 73 sets of returned surveys and 91 chart reviews.

Chart reviews were performed on 91 participant medical records, with no missing data. The data obtained during the chart reviews included information about participants: age; gender; presence of diabetes, priority of the surgical procedure. Outcomes of care were also obtained from chart reviews including the occurrence of the adverse events pulmonary, urinary tract, or wound infections (sternal and saphenous vein graft sites), hospital re-admissions, and mortality.

A summary of participant variables is presented in Table 3.2 and Table 3.3. Participants ranged in age from 39.60 years to 88.00 years of age, with a mean age of 66.08 years of age ($SD = 10.42$). A majority of participants were male (68.1%, $N = 62$). Participants were hospitalized in two facilities, and had care administered by one of two NPs. NP A provided care for all patients at Hospital A for 45.1% of patients ($N = 41$), with NP B who provided care for all patients at Hospital B 54.9% of patients ($N = 50$). The majority of patients (64.8%) were classified as having urgent surgical surgery ($N = 59$), 28.6% were classified as having elective surgery ($N = 26$), and 6.6% were classified as having emergent surgery ($N = 6$). There were $N = 43$ (47.3%) participants with diabetes.

A summary of patient outcomes for adverse events, mortality, hospital re-admissions are summarized in Table 3.5. Data were analyzed for cost of care. The charges for participants’ hospital stay ranged from $42,727.99 to $287,896.00, with a mean of $82,732.07 ($SD = 37,444.30$).
Additionally, scores for perceptions of satisfaction and health related quality of life (HRQOL) were calculated. The average participant level of satisfaction with return ranged from 46.66 to 100, with a mean satisfaction rating of 79.73. The summaries of scores for perceived satisfaction are presented in Table 3.6.

Scores for perceptions of health related quality of life (HRQOL) were also analyzed. The data were evaluated for quality using the QualityMetric scoring software. The data were 99.7% complete, with 100% of the data responses in range. Table 3.7 presents a summary of scores for perceptions of HRQOL.

**Primary Analyses**

**Research Question 1**

What is the perception of patients about HRQOL post CABG surgery when NPs are active participants in care? The scores for perceptions on all aspects of health related quality of life (HRQOL) are presented in Table 3.7. Mean scores range from 35.95 (SD = 22.68) for Role Physical (RP) to 71.98 (SD 19.32) for mental health (MH). The mean summary score for physical function were 37.45 (SD = 8.12) with a mean summary score for mental health of 46.71 (SD = 11.18). Histograms that display the data are presented for HRQOL physical component summary scores (Figure 4.1) and for HRQOL mental health component summary scores (Figure 4.2). Findings for mental health indicate that participants had a positive affect, felt calm and peaceful, and had low psychological
distress. Findings for physical health indicate that participants had limitations or disabilities related to pain, felt tired, or had low energy levels.

**Figure 4.1** Histogram Health Related Quality of Life Physical Component Summary Scores
Research Question 2

What is the perception of patients about satisfaction with care post CABG surgery when NPs are active participants in care? These scores were previously summarized in Table 3.6. The summary satisfaction ratings, excluding the allegiance item (willingness to return) ranged from 46.29 to 100, with a mean rating of 78.31 ($SD = 15.99$). The highest mean score was for nurse (M = 83.33; SD = 20.01), with the lowest mean score for billing procedure (M = 66.97; SD = 24.71). These scores indicate high satisfaction with all aspects of hospitalization, except for the billing procedure.
Research Question 3

What are the outcomes for patients post CABG surgery when NPs are active participants in care? The outcomes evaluated included the occurrence of adverse events, cost of care, mortality, and re-admissions within 30 days of discharge.

Patients experienced a range of adverse events during their hospital stay that were previously summarized Table 3.5. The number of participants who were diagnosed with a respiratory infection was N = 10 (11.0%) No participants were diagnosed with a sternal wound infection during their hospital stay. A minority of participants (8.8%) were diagnosed with a urinary tract infection (N = 8) A small number of participants (2.2%) were diagnosed with a leg infection where they had a saphenous vein graft removed (N = 2).

The cost of patients’ stay ranged from $42, 727.99 to $287,896.00, with an average cost of $82, 732.07 (SD = 37,444.30. 01. The occurrence of mortality was N = 1, (1.09%) for in-hospital mortality and N = 3 for 30 day mortality (3.29%). Hospital re-admission rates were a total of 23.1% (N =22); 2.2% (N = 2) emergency department admissions, 2.2% (N = 2) observation admissions, and 19.8% (N = 19.8%) in-patient re-admissions.

Research Question 4

What is the role of the NP for the care of patients who have CABG surgery? NP activities and frequency of activities were previously described in Table 4.1 and 4.2. The NPs performed direct care activities the greatest number of times weekly; including
seeing patients from 60 to 80 times per week, with a mean of 69.01 patient visits per week ($SD = 10.01$). Other common activities of the NP were listed as performing patient history and physicals (range 0-10 weekly), ordering lab and/or x-ray studies (range 5 - 15 weekly) coordinating discharge plans (range 5 – 10 weekly), monitoring patients’ progress (range 20 – 60 weekly), collaborating with health care team members ($M = 20$; $SD = 20$), and performing patient and/or family teaching (ranged 5 - 20 weekly). NP reported spending less time initiating specialty consultations, examining and cleaning wounds, performing nursing in-service education, and quality assurance.

**Secondary Analysis**

**Correlations**

Additional analysis of the data was conducted to explore for relationships among major variables in the study using Pearson’s Product Moment correlation, point-biserial correlation, and phi coefficient. The variables explored were the outcome variables adverse events, re-hospitalization, perceptions of HRQOL and perceptions of satisfaction. These were examined for their relationship to age, gender, hospital (also indicative of NP), diabetes, surgical priority with adverse events and hospital re-admissions. Mortality was not further explored due to the low number of occurrences ($N = 3$). Surgical priority was re-coded into a dichotomous variable; non-emergent or urgent/emergent. This was performed due to the low number of emergent surgeries ($N = 6$).
Adverse Events and Hospital Re-admission

Point-biserial correlations and phi coefficient were computed to examine the relationships of the occurrence of hospital readmission, respiratory infection, urinary tract infection, infection of the leg where saphenous vein graft was removed with age, gender, comorbidity, diabetes, surgical priority and hospital (See Table 4.2). Sternal wound infection could not be analyzed because no one in the current study had developed this infection. Table 4.2 presents these findings.

Table 4.2. Correlation Table of Hospital Readmission and Individual Adverse Events

<table>
<thead>
<tr>
<th></th>
<th>Age</th>
<th>Gender</th>
<th>Diabetes</th>
<th>Surgical Priority</th>
<th>Hospital</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hospital Readmission</td>
<td>-0.070</td>
<td>0.275</td>
<td>**0.031</td>
<td>-0.041</td>
<td>0.138</td>
</tr>
<tr>
<td>Respiratory Infection</td>
<td>0.043</td>
<td>0.137</td>
<td>-0.051</td>
<td>0.222</td>
<td>*0.099</td>
</tr>
<tr>
<td>Urinary Tract Infection</td>
<td>0.096</td>
<td>0.204</td>
<td>0.173</td>
<td>-0.061</td>
<td>0.040</td>
</tr>
<tr>
<td>Leg Infection</td>
<td>0.039</td>
<td>0.219</td>
<td>*0.008</td>
<td>0.095</td>
<td>-0.018</td>
</tr>
</tbody>
</table>

Significance * p < .05; ** p < .01
Results

Age, diabetes, and hospital were not significantly correlated with hospital readmission, respiratory infection, urinary tract infection or infection of the leg, non-significant.

Gender was positively significantly correlated with adverse events, $\rho (91) = .275$, $p < .01$, indicating that women were more likely to be readmitted back into the hospital than men. Gender was also significantly correlated with leg infection, $\rho (91) = .219$, $p < .05$, indicating that women were also more likely to develop a leg infection where the saphenous vein graft was removed.

Surgical priority was significantly correlated with respiratory infection, $\rho (91) = .222$, $p < .05$, indicating that patients who had urgent or emergent surgery were more likely to develop a respiratory infection than those who were receiving elective surgery.

Perceptions of Health Related Quality of Life

Pearson Product Moment and point-biserial correlations were conducted to examine the relationships of individual health related quality of life items (e.g., physical functioning, role physical, bodily pain, general health, vitality, social functioning, role emotional, mental health, physical component summary score and mental component summary score), with age, gender, diabetes, surgical priority and hospital. Surgical priority was recoded into either non-emergent or urgent/emergent to produce a dichotomous variable. This was performed since there were a small number of emergent procedures ($N = 6$). These findings are shown in Table 4.3.
Findings

Age was positively significantly correlated with scores for bodily pain, \( r (73) = .423, p < .01 \), indicating that older patients tended to have higher scores, indicating less bodily pain than younger patients. Age was also significantly positively correlated with general health \( r (73) = .401, p < .01 \), indicating the older patients tended to have higher general health scores than younger patients. Additionally age was significantly positively correlated with mental health, \( r (73) = .286, p < .05 \), indicating that older patients tended to have higher mental health scores than younger patients. Age was also significantly positively correlated with physical component summary score, \( r (73) = .293, p < .05 \), indicating that older patients tended to have higher physical component summary scores than younger patients. Finally, age was not significantly correlated with any of the other health related quality of life items, all non-significant.

Gender was significantly negatively correlated with physical functioning, \( \rho (73) = -.358, p < .01 \), indicating that men were more likely to have higher physical functioning scores than women. Gender, however, was not significantly correlated with any of the health related quality of life items, all non-significant.

Hospital was significantly negatively correlated with bodily pain, \( \rho (73) = -.245, p < .05 \), indicating that patients cared for at Hospital B were more likely to have lower scores for bodily pain, indicating higher perceptions of pain than participants at Hospital A. Hospital was also significantly negatively correlated with social functioning, \( \rho (73) = -.246, p < .05 \), indicating that patients cared for at Hospital B were more likely to have lower social functioning scores than those cared for at Hospital A. Finally, Hospital was
also significantly negatively correlated with physical component summary scores, $\rho (73) = -0.233, p < .05$, indicating that patients cared for at Hospital B were more likely to have lower physical component summary scores than those cared for at Hospital A. Hospital was not significantly correlated with any of the other quality of life items, all non-significant.

Diabetes and surgical priority were not significantly correlated with any of the individual health related quality of life items, all non-significant.
Table 4.3. Correlations of Health Related Quality of Life Items

<table>
<thead>
<tr>
<th></th>
<th>Age</th>
<th>Gender</th>
<th>Diabetes</th>
<th>Surgical Priority</th>
<th>Hospital</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical functioning</td>
<td>0.059</td>
<td>-0.358</td>
<td>**</td>
<td>-0.084</td>
<td>-0.075</td>
</tr>
<tr>
<td>Role physical</td>
<td>0.171</td>
<td>-0.080</td>
<td></td>
<td>0.030</td>
<td>-0.200</td>
</tr>
<tr>
<td>Bodily pain</td>
<td>0.423</td>
<td>**</td>
<td>0.051</td>
<td>0.086</td>
<td>-0.189</td>
</tr>
<tr>
<td>General Health</td>
<td>0.401</td>
<td>**</td>
<td>-0.161</td>
<td>0.044</td>
<td>-0.002</td>
</tr>
<tr>
<td>Vitality</td>
<td>0.006</td>
<td>-0.191</td>
<td></td>
<td>0.008</td>
<td>-0.061</td>
</tr>
<tr>
<td>Social functioning</td>
<td>0.205</td>
<td>-0.050</td>
<td>0.170</td>
<td>-0.020</td>
<td>-0.246</td>
</tr>
<tr>
<td>Role emotional</td>
<td>-0.007</td>
<td>-0.221</td>
<td>0.015</td>
<td>-0.101</td>
<td>0.002</td>
</tr>
<tr>
<td>Mental health</td>
<td>0.286</td>
<td>*</td>
<td>-0.058</td>
<td>0.009</td>
<td>0.099</td>
</tr>
<tr>
<td>Physical component</td>
<td>0.293</td>
<td>*</td>
<td>-0.143</td>
<td>-0.030</td>
<td>-0.091</td>
</tr>
<tr>
<td>Mental component</td>
<td>0.118</td>
<td>-0.134</td>
<td>0.075</td>
<td>-0.002</td>
<td>-0.109</td>
</tr>
</tbody>
</table>

Significance * $p < .05$, ** $p < .01$. 
Table 4.4. Correlations of Patient Satisfaction Items

<table>
<thead>
<tr>
<th></th>
<th>Age</th>
<th>Gender</th>
<th>Diabetes</th>
<th>Surgical Priority</th>
<th>Hospital</th>
</tr>
</thead>
<tbody>
<tr>
<td>Admission Procedure</td>
<td>0.114</td>
<td>-0.080</td>
<td>-0.040</td>
<td>0.010</td>
<td>-0.175</td>
</tr>
<tr>
<td>Total Care</td>
<td>0.117</td>
<td>-0.025</td>
<td>-0.091</td>
<td>-0.058</td>
<td>-0.214</td>
</tr>
<tr>
<td>Keeping Informed</td>
<td>0.086</td>
<td>0.008</td>
<td>-0.074</td>
<td>-0.109</td>
<td>-0.050</td>
</tr>
<tr>
<td>Nurse</td>
<td>0.137</td>
<td>-0.135</td>
<td>0.006</td>
<td>-0.178</td>
<td>-0.035</td>
</tr>
<tr>
<td>Physician</td>
<td>0.127</td>
<td>-0.044</td>
<td>-0.001</td>
<td>0.123</td>
<td>-0.063</td>
</tr>
<tr>
<td>Other staff</td>
<td>0.090</td>
<td>-0.127</td>
<td>-0.061</td>
<td>-0.100</td>
<td>-0.074</td>
</tr>
<tr>
<td>Living Arrangement</td>
<td>0.112</td>
<td>-0.118</td>
<td>0.050</td>
<td>-0.076</td>
<td>-0.184</td>
</tr>
<tr>
<td>Discharge Information</td>
<td>0.098</td>
<td>-0.040</td>
<td>-0.096</td>
<td>-0.131</td>
<td>0.037</td>
</tr>
<tr>
<td>Billing Procedure</td>
<td>0.319*</td>
<td>-0.086</td>
<td>-0.114</td>
<td>-0.187</td>
<td>-0.232</td>
</tr>
<tr>
<td>Total Satisfaction</td>
<td>0.163</td>
<td>-0.108</td>
<td>-0.055</td>
<td>-0.102</td>
<td>-0.158</td>
</tr>
</tbody>
</table>

Significance * $p < .05.$
Perceptions of Satisfaction

Pearson Product Moment and Point-biserial correlations were conducted to examine the relationships of individual satisfaction items (e.g., admission procedure, total care, keeping patient informed, satisfaction with nurse, satisfaction with physician, satisfaction with other staff, living arrangements, information at discharge, billing procedure) with age, gender, diabetes, surgical priority and hospital. These correlations are presented in Table 4.4.

Findings

The only finding of significance in this analysis was that age was positively significantly correlated with billing procedure, \( r(72) = .319, p < .05 \), indicating that older patients tended to be more satisfied with the billing procedure than younger patients. Age was not significantly correlated with any of the other satisfaction items or total satisfaction score, all non-significant. Gender, diabetes, surgical priority, and hospital were not significantly correlated with any of the satisfaction item scores, all non-significant.

Additional Analyses Multiple Regression

A limited number of regression analyses were performed based on theoretical assumptions. The decision to run additional analyses was based on the identification of
significance for correlations on the outcomes HRQOL physical functioning, bodily pain, and mental health since these are important components of hospitalization and recovery for patients who have CABG surgery.

**Health Related Quality of Life Physical Functioning**

A multiple regression analysis was conducted to further explore the data to identify how much variance for HRQOL physical functioning is explained from hospital, age, gender, surgical priority, and diabetes. As shown in Table 4.5, the overall model predicting physical functioning was marginally significant, $F(5, 67) = 2.34, p = .051$, and explained 14.9% of the variance. Additionally, gender was a significant predictor of physical functioning, $Beta = -.354, p < .01$, indicating that women, compared to men, were more likely to have a lower level of quality of life for physical functioning.

*Table 4.5. Summary of Multiple Regression Predicting Health Related Quality of Life Physical Functioning*

<table>
<thead>
<tr>
<th>Unstandardized Coefficients</th>
<th>$b$</th>
<th>$SE$</th>
<th>$Beta$</th>
<th>$T$</th>
<th>$p$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hospital</td>
<td>-4.436</td>
<td>5.51</td>
<td>-0.096</td>
<td>-0.81</td>
<td>.423</td>
</tr>
<tr>
<td>Age</td>
<td>0.200</td>
<td>0.26</td>
<td>0.088</td>
<td>0.77</td>
<td>.443</td>
</tr>
<tr>
<td>Gender</td>
<td>-17.741</td>
<td>5.82</td>
<td>-0.354</td>
<td>-3.05</td>
<td>.003</td>
</tr>
<tr>
<td>Diabetes</td>
<td>-4.197</td>
<td>5.31</td>
<td>-0.092</td>
<td>-0.79</td>
<td>.432</td>
</tr>
<tr>
<td>Surgical Priority</td>
<td>1.102</td>
<td>6.42</td>
<td>0.021</td>
<td>0.17</td>
<td>.864</td>
</tr>
</tbody>
</table>
Health Related Quality of Life Mental Health

A multiple regression analysis was conducted to identify how much variance for HRQOL mental health is explained from hospital, age, gender, surgical priority, and diabetes. As shown in Table 4.6, the overall model predicting mental health was a marginally significant predictor of quality of life mental health, $F(5, 67) = 2.10, p = .08$, and explained 13.5% of the variance. Age was a significant predictor of quality of life mental health, $Beta = .300, p < .05$, indicating that older patients had higher quality of life mental health scores when compared to younger patients.

Table 4.6. Summary of Multiple Regression Predicting Health Related Quality of Life Mental Health

<table>
<thead>
<tr>
<th></th>
<th>Unstandardized Coefficients</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$b$</td>
<td>$SE$</td>
<td>$Beta$</td>
<td>$t$</td>
<td>$p$</td>
</tr>
<tr>
<td>Hospital</td>
<td>-6.880</td>
<td>4.70</td>
<td>-0.176</td>
<td>-1.46</td>
<td>.148</td>
</tr>
<tr>
<td>Age</td>
<td>0.579</td>
<td>0.22</td>
<td>0.300</td>
<td>2.62</td>
<td>.011</td>
</tr>
<tr>
<td>Gender</td>
<td>-4.207</td>
<td>4.96</td>
<td>-0.099</td>
<td>-0.85</td>
<td>.400</td>
</tr>
<tr>
<td>Diabetes</td>
<td>-1.007</td>
<td>4.53</td>
<td>-0.026</td>
<td>-0.22</td>
<td>.825</td>
</tr>
<tr>
<td>Surgical Priority</td>
<td>8.425</td>
<td>5.47</td>
<td>0.186</td>
<td>1.54</td>
<td>.128</td>
</tr>
</tbody>
</table>

Health Related Quality of Life Bodily Pain.

A multiple regression analysis was conducted to identify how much variance for HRQOL bodily pain is explained from hospital, age, gender, surgical priority, and
diabetes. As shown in Table 4.7, the overall model predicting bodily pain was significant, $F(5, 67) = 4.35, p < .01$, and explained 24.5% of the variance. Age was a significant predictor of bodily pain, $Beta = .400, p < .01$, indicating that older patients were more likely to have higher scores for perceptions of pain thus indicating lower perceptions of pain than younger patients. Furthermore, hospital was a marginally significant predictor of bodily pain, $Beta = -.201, p = .08$, indicating that patients who were cared for at Hospital B, compared to Hospital A, had lower bodily pain scores, indicating higher perceptions of pain.

*Table 4.7. Summary of Multiple Regression Predicting Health Related Quality of Life*

*Bodily Pain*

<table>
<thead>
<tr>
<th></th>
<th>Unstandardized Coefficients</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$b$</td>
<td>$SE$</td>
<td>$Beta$</td>
<td>$t$</td>
<td>$p$</td>
</tr>
<tr>
<td>Hospital</td>
<td>-9.481</td>
<td>5.30</td>
<td>-0.201</td>
<td>-1.79</td>
<td>.078</td>
</tr>
<tr>
<td>Age</td>
<td>0.934</td>
<td>0.25</td>
<td>0.400</td>
<td>3.74</td>
<td>.000</td>
</tr>
<tr>
<td>Gender</td>
<td>3.429</td>
<td>5.60</td>
<td>0.067</td>
<td>0.61</td>
<td>.543</td>
</tr>
<tr>
<td>Diabetes</td>
<td>-0.010</td>
<td>5.11</td>
<td>0.000</td>
<td>0.00</td>
<td>.998</td>
</tr>
<tr>
<td>Surgical Priority</td>
<td>-6.604</td>
<td>6.18</td>
<td>-0.120</td>
<td>-1.07</td>
<td>.289</td>
</tr>
</tbody>
</table>
Chapter Summary

The statistical analyses used for this study were presented. Descriptive analysis was the primary method used. Additional exploration of the data was conducted to identify relationships between the major variables in this study. Further, regression analysis was performed based on the identification of relationships in the correlational analyses.
Chapter 5

Discussion of Findings

This chapter presents a discussion of the findings, conclusions, and recommendations based on the analysis of the data. The following information is presented in this chapter: the answer to each research question, conclusions; study limitations; and implications for nursing practice, research, and education.

This research study was conducted to determine how quality is perceived from the perspective of patients hospitalized for commonly occurring, high risk conditions. Quality was viewed as the “degree to which health services for individuals and populations increase the likelihood of desired health outcomes and are consistent with current professional knowledge (Institute of Medicine [IOM], 2000, p. 211). Quality is often measured as outcomes and effectiveness of care. Effectiveness is described as a “profile of specific outcomes of care that occur as a result of everyday practice conditions” (Donabedian, 1990; Guadagnoli, & McNeil, 1994; Petitti, 1998, p. 249). The perspective of the patient has taken on new meaning since the IOM’s report that recommends that health professionals provide care that is patient-centered and based on individual preferences (IOM, 2001). A renewed focus on quality was initiated following the IOM’s landmark report “To Err is Human: Building Safer System,” which noted that 98,000 people die annually in hospitals from preventable adverse events (Kohn, et al., 2000). An additional recommendation by the IOM included establishing priorities for quality improvement in health care (Adams & Corrigan, 2003). One priority
recommendation was determining the appropriate care needed for patients with high frequency, high cost conditions; such as ischemic heart disease and CABG surgery (Adams & Corrigan).

This study also described the outcomes for patients post CABG surgery when NPs were actively involved in patient care and the role of the NP as direct care provider for these patients. The outcomes described were adverse event, cost, mortality, and hospital re-admissions. NPs are a group of health care providers who were originally educated to provide primary care services (Kalish & Kalish, 1986; Keeling & Bigbee, 2005) but are now commonly found in hospital settings (Kleinpell, 2005). The literature about outcomes for patients in acute care is currently limited. The studies reviewed used differing types of hospital units, and varying outcomes. The most frequently measured outcomes in acute care were traditional medical ones (Counsell & Gilbert, 1999; Cowan, et al., 2006; Dahle, et al., 1998; Dahl & Penque, 2001; Ettner, et al., 2006; Hoffman, et al., 2005; Lambling, et al, 2004; Sidani, et al., 2006; Ritz, et al., 2000; Sarkissian & Wennberg, 1999), with limited research about measured related patient sensitive indicators of quality, such as perceptions of health related quality of life and satisfaction.

**Discussion of Findings**

**Research Question 1**

In this study, patient perceptions of health related quality of life (HRQOL) ranged from 35.95 (SD = 22.68) for physical role (PR) to 71.99 (SD = 19.32) for mental health
The physical component summary score mean was 37.45 (SD = 8.12) and the mental component summary score mean was 46.71 (SD = 11.19). Individual normative based scores (NBS) for study participants ranged from 31.88 (SD = 8.92) for physical role to 48.37 (SD = 10.91) for mental health. Since the return rate for this study was 82.9%, this measure was considered a reliable measure of perceptions of HRQOL. These findings can be interpreted alone and then by comparing participant scores the NBS scores for patients with heart disease in the general population.

The participant scores for PR were low, indicating that participants perceived they were limited a lot in performing physical functions one month after the CABG surgery. Higher levels of perceived function for MH indicated that participants had higher levels of MH functioning one month after the CABG surgery. When comparing NBS for participants to the average score for people in the general population with a diagnosis of heart disease (including CABG surgery); average NBS PR scores for the study participants were 31.88 (SD = 8.92) compared to 40.09 (SD = 10.74) in the general population of people with heart disease (Ware, et al., 2008). Average NBS for MH in the study participants were 46.71 (SD = 11.19) compared to NBS for MH in the general population of people with heart disease of 48.48 (SD = 10.13) (Ware, et al.). Participant NBS that fall more than 1 SD below the population mean are considered to have significantly impaired functioning (Ware, et al., 2008). Thus, the findings from this investigation suggest that study participants were significantly impaired for physical functioning, but not impaired for mental health.

These finding demonstrate the impact that hospitalization and CABG surgery had on the study participants’ ability to function physically and emotionally during the post-
operative period. This information can be of value to patients and providers alike. Development or selection of appropriate personnel, resources, and strategies for patients that prepare them for CABG surgery and recovery can be identified and developed. Strategies that enhance both physical health and mental health would improve a patient’s ability to function in both domains after a critical procedure. Patients may in turn opt to select hospitals for their surgery if they provide a more comprehensive approach in the care of CABG patients.

Other NBS results indicated that study participants were within 1 SD for scores of the general population with heart disease for the remainder of the health components; bodily pain, general health, vitality, social functioning; and role emotional. This indicates no significant impairment for these areas of health related quality of life. This may suggest that the current processes of care received by the patients in this study were adequate to support patient perceptions of bodily pain, general health, vitality, social functioning and emotional role for the participants who had CABG surgery.

One researcher who studied HRQOL as an outcome for hospitalized patients had some similar findings. Sidani et al. (2006) studied HRQOL for patients who were hospitalized for high frequency problems; CABG surgery, cancer, knee or hip replacement surgery, cardiac catheterizations, fracture repair, or spinal laminectomy who had care provided by NPs. Patients who received care from NPs had statistically higher level of HRQOL for physical and mental health scores compared to the physician group. Of particular interest was that differences between the two groups were greatest for the mental health scores. Tranmer & Parry (2004) found no significant difference between the NP group and the physician group for HRQOL for patients following CABG surgery.
Because there was not a non-NP comparison group, this current investigation was not able to adequately evaluate the impact of NP providers on HRQOL.

The findings from the current research, taken together with the findings from Sidani et al.’s (2006) related to patient perceptions of MH may suggest that one factor that can influence MH is the role of the NP. Sidani et al. considered that the added value of the NP may be the contribution they make in addressing the mental health of patients. The NPs in this study indicated that they spent the majority of time in direct patient care activities such as performing exams, monitoring patient progress, and patient and family education. It is not known if one of those daily roles influenced patient perceptions of MH, or the other perceptions of HRQOL, though the NP-client relationship is considered a unique component of the NP role. Research about which specific NP roles or functions affect hospitalized patients mental health has not been explored in the literature, and would make an important contribution and an important consideration to be explored in a subsequent study.

Additional analysis was performed to explore any correlations for HRQOL individual and summary scores to other major participant variables. Interestingly, there was a positive correlation between age and scores on HRQOL mental health (MH) (r = .286), such that older individuals had higher MH scores. Age was also correlated with physical component scores: HRQOL general health (GH) (r = .401); bodily pain (BP) (r = .423); and physical component summary (PCS) (r = .293) indicating that older individuals perceived their physical health and symptoms to be better than younger participants. In addition, regression analyses indicated that age was a significant predictor for BP and MH, but not for PF. These findings may reflect the age of the participants, the
nature of chronic illness, the timing of the survey, or other unknown or confounding variables in this study. Older participants or those with chronic conditions may experience more symptoms, but adapt to illness over time.

The findings related to age, from this study, are supported by NBS scores for the general population on mental health. Scores for the general population show that mental health summary and individual score increase slightly from 45 to 75 years of age, and then slightly decrease (Ware, et al., 2008). These results were consistent for males and females. Since older patients are more likely to have chronic, complex health issues; they are also more likely be admitted to hospitals and come into contact with all forms of health care providers. This suggests that providers and institutions recognize individual patient strengths; such as a propensity for positive mental health, as well as special needs; such as lower physical functioning and tailor interventions to patient preferences and needs.

Impairments in physical health are often an anticipated consequence of chronic disease; and the aging process. Aging also increases the risk of hospitalization. These combined factors point to the need for interventions of care (the clinical process) and the system of care (provider, NP) to support patients’ physical health, which in turn may impact mental health and the overall satisfaction with care and the hospital experience.

An additional consideration is the role of each NP at the hospitals where participants received care. Participants in Hospital B were found to experience more pain, have lower physical summary scores, and had lower social functioning scores than participants in Hospital A. The data obtained from the NPs, as well as the low number of
NPs in the study does not allow for any conclusions to be drawn. Additional research, using a larger sample with a more precise measurement of the NP role would be needed.

The findings discussed about perceptions of HRQOL can be described and related back to the Quality Health Outcomes Model (Mitchell, et al., 1998) used to guide this research. The QHOM demonstrates the complex relationship between: system (NP as provider); client variations of health, demographics, and disease risk factors (patient); intervention (NP role); and outcomes (HRQOL). The finding from this study demonstrated positive results for the mental health of patients when care was provided by NPs. One other researcher demonstrated similar findings (Sidani, et al., 2006), thus setting the stage for a next-step investigation to identify which interventions or NP roles assist hospitalized patients to develop or maintain mental health, as well as physical health.

In summary, perceptions of patients post CABG surgery related to HRQOL when care was provided by NPs; specifically the findings on physical and mental health, identify the need for additional research to determine what component of the NP role will help patients to maximize mental health and physical health.

**Research Question 2**

In this study patient perceptions of satisfaction post CABG surgery for patients who had care from NPs had a mean total satisfaction score of 78.31 (SD = 15.99) indicating an overall rating of very good to excellent. Study participants were most satisfied with nursing care (M = 83.33, SD = 20.01) and the total daily care received (M
Daily care activities were evaluated on the sensitivity of staff to individual concerns and the coordination of care. Perceptions of good to excellent satisfaction for this item may reflect the different individual who provided daily care. NPs indicated that they coordinated care, provided regular patient assessment, monitored patients, and education, which may reflect a component of the measure on daily care. The nursing care items measured by the satisfaction questionnaire were the attention of nurses to the patient’s condition and the quickness of a nurse’s response to a patient’s call for help which reflect solely with the nursing personnel on the unit, or may have included the regular attention from the NP. Individual participants may not have differentiated between the general floor nursing staff and the NP. Another explanation for these particular high satisfaction ratings may include social desirability; the tendency of participants to answer questions in a manner that reflect the researcher or hospital beliefs, or to make themselves look good (Babbie, 2004; Maciejewski, et al., 1997), though social desirability is considered to be a more common problem when surveys are completed face to face, rather than mailed (Babbie). Conversely, it is also possible that patients who declined to participate in the research, or those who did not return the satisfaction surveys may have had certain characteristics that would result in lower satisfaction scores than study participants.

The results for perceived satisfaction were judged to be very good to excellent for all aspects of care, except the billing procedure (M = 66.97; SD 24.71). The billing procedure item results were based on 57 respondents who answered this question (78%). The remaining participants (N = 16) selected the “does not apply” choice. Research has demonstrated that perceived general satisfaction reflects interpersonal and
communication skills of personnel (Maciejewski, et al., 1997), considered to be a core component of NP education (National Organization of Nurse Practitioner Faculties [NONPF], 2006). The very good to excellent ratings for the majority of the satisfaction items may be related to the interpersonal and communication skills of unit personnel, including the skills of the NP. The additional analysis conducted for perceived satisfaction provided no additional insight.

Patient satisfaction is considered an important measure used to evaluate patient preferences (Maciejewski, et al., 1997) and was identified as a common measure for patients who were cared for by NPs in the research reviewed for this study (Counsell & Gilbert, 1999; Miers, 2002; Sarkissian & Wennberg, 1999; Sidani, et al., 2006; Tranmer & Parry, 2004). Counsell and Gilbert evaluated patient outcomes for patients who were introduced to the role of the NP in a hospital heart failure unit. Patient satisfaction was measured by the number of patient complaints in this study; and judged to be better after the introduction of the NP. No conclusions can be drawn from these findings since this measure of satisfaction has no documentation as a valid or reliable measure of satisfaction.

Sarkissian and Wennberg (1999) studied outcomes for patients in a hospital seizure unit who received care from acute care nurse practitioners (ACNP) compared to care prior to the use of ACNPs. A tool that was developed for the research was used to identify satisfaction, with reported face validity (no reported reliability). Participants responded that they were all completely satisfied or satisfied with the ACNP care. No data for satisfaction was available for satisfaction prior to the use of ACNPs. Again, these
findings offer no support in determining if NP care affects patient satisfaction, since no comparison was used for this outcome.

Miers (2002) performed a 2-group retrospective study to compare patient outcomes post CABG surgery when an ACNP was included in the team of care. Patient satisfaction was measured as a monthly mean score from the two units where patients received care using the hospital’s Press-Ganey Questionnaire, and included scores for patients who were not part of the study. No significant difference was found between the two groups for patient satisfaction. Since the measure of satisfaction used in this research also reflected patients who may not have participated in the research, no conclusion can be made about the influence of the introduction of the NP for the care of CABG surgery patients.

Tranmer and Parry (2004) evaluated patient satisfaction of patients after they were discharged to home post CABG surgery when follow-up care was provided by an advanced practice nurse (APN) compared to usual care. Satisfaction was measured with a valid and reliable tool. Participants in this study were more satisfied with the NP care than with the standard care, though, no statistical significance was reached. These findings suggest that the NP intervention, which included phone calls from for patient and family support over a 5-week period, may not be sensitive to perceptions of satisfaction or have the desired impact on the patient. This finding further demonstrates a need to develop patient centered interventions.

Sidani, et al. (2006) reported statistically significant higher levels of satisfaction with care for patients who received care from ACNPs compared to those who did not for patients hospitalized in three separate units for patients with commonly occurring
medical conditions, including CABG surgery. Satisfaction was measured with a valid and reliable tool. The researchers found that patients who received care from NPs had higher mean scores for patient satisfaction than scores for the comparison group, finding a large effect size. These findings support the relationship between the use of NPs and patient satisfaction.

More recently, Thrasher and Purc-Stephenson (2008) measured patient satisfaction with care delivered by NPs in hospital emergency departments. A tool, specifically designed to measure patient satisfaction with NP care was developed for the study. Patients rated the care received from NPs as high in comprehension and attentiveness, but had only moderate understanding of the NP role. This demonstrates support for NP care, but also that patients may still not understand the role of NPs. This is an interesting finding given the fact that NPs have been in existence for more than 30 years, though have more recently been providing care to patients in hospital settings.

Few conclusions can be drawn based on the research reviewed. The Counsell & Gilbert (1999) study used patient complaints as a measure of perceived satisfaction. There is no known evidence to support patient complaints as a valid measure of satisfaction. Miers (2002) and Tranmer & Parry (2004) found no statistical significance for patient satisfaction. Sarkissian and Wennberg (1999) and Sidani, et al. (2006) identified that patients who received care from NPs during their hospitalization had reported statistically significant higher satisfaction scores (on global measures) for patients who had NP care. Thrasher and Purc-Stephenson (2008) used a tool, specific to the NP, which may be cumbersome in clinical practice. Minimal evidence currently exists about perceptions of patient satisfaction specific to NP care.
Patients often rate providers and hospitals positively (Maciejewski, et al., 1997). The current tools used to evaluate satisfaction may not capture the effects of the role of the NP on a patient’s hospitalization experience. Patients perceptions of NP role performance would provide useful information, thus additional research is warranted. Instruments that specifically measure satisfaction with NP care may need to be used in further research to identify the impact of NP on patients perceptions of satisfaction and function of the NP in this clinical setting.

Patients in this study rated satisfaction for all components of care very good to excellent, with the exception of the billing procedure. Patient satisfaction is considered to be an indicator of quality of care and is often rated highly by patients (Maciejewski, et al., 1997; Mitchell, et al., 1998). The use of perceptions of patient satisfaction in this study served to identify quality from the perspective of the patient and is thus considered an aspect of patient centered care. Maciejewski, et al. noted that “patient satisfaction is perhaps the most important evaluative outcome in a patient’s health care experience” (p. 75). The use of this measure demonstrates a beginning description of patient perceptions of satisfaction when care is provided by NP.

**Research Question 3**

The outcomes described in this study were adverse events, cost, mortality, and re-admissions. The occurrence for all adverse events for patients post CABG surgery who were cared for by NPs was 20.9% (n = 19). One study participant (1.1%) experienced two adverse events, with all other (n = 18) experiencing one. The type of adverse events that
occurred were respiratory infections, n = 10 (11%); wound infections, n = 2 (2.2%); urinary tract infections n = 8 (8.8%).

These finding represent higher than average adverse events than reported by the PA Health Cost Containment Council (PHC4) since the occurrence of adverse events in patients who have CABG has decreased over time (Cardiac Surgery, 2008). PHC4 noted that hospital acquired infections for patients who had CABG procedures were 5.1% for the year 2006 (Cardiac Surgery, 2008). The findings from this study may have been related the type of participant in the study. There are many factors that contribute to an increased risk for adverse events associated with CABG surgery. Variables associated with an increase in patient morbidity are increased age (Edwards, et al., 1997; Hannan & Burke, 1994; PHC4 Technical Notes, 2007), female gender (O’Connor, 1993), prior heart surgery (Edwards, et al., 1997; O’Connor, et al., 1991; PHC4 Coronary Artery, 2002); diabetes, hypertension, or kidney disease (Smith, et al., 1991), and urgency of surgery (Eagle, et al., 1999; PHC4 Coronary Artery 2002; O’Connor et al., 1991; Rankin, 1991). The variables that had the greatest impact on adverse events in prior research were age, gender, diabetes, urgent or emergent priority of surgery (Eagle et al., Cardiac Surgery, 2008) and these were the variables used to describe the participants in this research.

The average age of participants was 66.08, while females represented only 31.9% of the participants. A large percent of patients in this research had diabetes (47.3%), while the majority of participants (71.4%) had urgent or emergent surgery. These are all considered risk factors for adverse events and are plausible explanations for the high occurrence of adverse events. The only additional finding to come out of this research was that more women than men experience a wound infection. This may have been
related to their rate of diabetes, though no statistical conclusion could be drawn due to the low number of females in the study. There is a paucity of information about how NPs may influence the occurrence of adverse events for patients who have CABG surgery. One would anticipate that the daily interventions described by the NPs in the study would result in a lower rate of adverse events. NPs described that the majority of their time was spent in direct patient care performing activities such as seeing patients, monitoring patient progress, and interpreting and ordering diagnostic studies. These activities should allow for the identification of potential or actual problems in a timely manner. Thus, it is plausible that the reporting of adverse events may have been higher in this study sample secondary to the keen assessment skills of these experienced NPs or that the impact of the emergent nature of the surgery in a large percentage of patients may have contributed to the high number of adverse events.

One research study reviewed for patients in hospitals who had care by NPs measured the occurrence of adverse events. Hoffman, et al. (2005) measured the number of re-intubations for patients in a respiratory intensive care unit (ICU) comparing physician/NP care to critical care resident/MD care. The NP group had a lower rate of patient re-intubations. While this study demonstrates an important decrease in an adverse event, no generalizations can be made, since adverse events are often specific to the clinical condition.

In this study the cost of care for patients post CABG surgery who received care from NP resulted in a mean hospital charge of $82,732.07 (SD = 37,444.30). The cost of care for study participants is lower than the average cost for all patients in PA having CABG surgery. The most recent data available showed that the mean hospital charge for
CABG surgery in all hospitals in PA was $128,725 in 2006 (Cardiac Surgery, 2008). Hospital charges reflect the total amount that a facility charges for all aspects of care of patients while they are hospitalized. Hospital charges can be used to compare cost across hospital setting. The payment that is received, or reimbursement, from a patient’s insurance will vary based on the insurance plan. It has been estimated that hospitals receive approximately 27% of established charges (Cardiac Surgery, 2008). During data exploration, cost of care was significantly correlated with length of stay \((r = .87)\). This correlation would be anticipated since as patients length of stay increases, hospital charges would accumulate. Study participants at Hospital B had planned follow-up with NP B one week after hospital discharge, while both NPs made follow-up phone calls to all participants. These interventions may have resulted in patients being discharged from the hospital earlier than patients in the PHC4 data set.

The outcome cost of care for patients having high frequency, high cost conditions is an important factor to consider when evaluating processes of care (Mitchell, et al., 1998) and the value of NP practice (Miller, et al., 2005). Cost of care has been used as an outcome measure for patients in a variety of clinical practice settings where NPs provide care with conflicting findings. Sakr, et al. (1999) and Lambing, et al. (2004) found that patients who received care from NPs in hospital emergency departments and hospital in-patient units had increased costs when compared to physicians. Ritz, et al. (2000) found no difference for the cost for patients who received care from NPs while hospitalized for heart failure when compared to physicians. Counsel & Gilbert (1999), Cowan, et al. (2006), Dahle, et al. (1998), Ettner et al. (2006) and Sarkissian & Wennberg (1999) found that patients who saw NPs in different hospital units reduced the cost of care. Miers
(2002) found that the cost of care for patients hospitalized for CABG surgery was reduced when NPs were part of the team of health care providers. The research identifies conflicted findings with costs that increased, decreased, or showed no difference. This may be related to the types of patients in the research or their associated clinical conditions. Different types of hospital procedures or hospital units may have a higher charge. It is not possible to generalize findings to all patients in hospitals with NP care.

In this study the occurrence of mortality for patients post CABG surgery when care was provided by an NP was 1.09% (n=1) during the in-patient hospital stay, with an additional 2.19% (n = 2) within 30 days of hospital discharge. These results compare to the most recent mortality statistics from PCH4 that documented a mortality rate 1.8% for in hospital mortality and 2.4% for 30 day mortality during 2006 (Cardiac Surgery, 2008). The low mortality rate for participants in this research is consistent with the PHC4 findings. Additional exploration of this variable could not be performed due to the low occurrence of mortality.

The findings for mortality may reflect the overall improvements in the surgical procedure and care associated with patients which have which resulted in decreased mortality statistics over time (Cardiac Surgery, 2008). Mortality is considered a traditional medical outcome (AHRQ Outcomes, n.d.) and remains an important aspect of studying the effectiveness of NPs caring for patients in hospitals. Dahl and Penque (2001) studied patients hospitalized for heart failure and found decreased mortality for patients who received care from NPs. Hoffman, et al., (2004) and Lambing, et al. (2004) studied geriatric patients and patient hospitalized in respiratory intensive care units and found no difference in mortality for the NP group compared to the physician group. Dahl and
Penque (2001) found mortality rates for patient hospitalized with heart failure decreased when care was provided by NPs.

There may have been occurrences of mortality after hospital discharge not captured through the chart review used for this study. These data may have missed given the possibility that patients may have entered hospitals other than the hospital where their surgery was performed.

In this study, the occurrence rates for hospital re-admissions for patients post CABG surgery when care was provided by an NP was 24.2% (n = 22); with 19% (n = 18) of participants re-admitted to an in-patient hospital bed, 2.2% (n = 2) of patients admitted to an observation bed (less than 24 hour stay) and 2.2% (n = 2) of patients admitted and then discharged from the hospital emergency department. Re-admission rates for participants in this study were greater than PHC4 2006 rates of 12.97% (Cardiac Surgery, 2008). These findings may be consistent with the sample demographics of this study, suggesting an increase risk for hospital re-admissions and adverse events related to age, presence of diabetes, or other co-morbid conditions. Another plausible explanation is that in this study there was a single data collector focused on obtaining a complete data set, and thus again the possibility of higher rates of tracking for all hospital admissions likely occurred. For example, the PHC4 does not track emergency department or observation admissions which were tracked in the current investigation.

The most common reason for hospital re-admission was congestive heart failure with shortness of breath followed by infection while PHC4 listed the most common reason for hospital re-admission as infection (Cardiac Surgery, 2008). PHC4 does not
measure observation admission (< 24 hour stays) or emergency department admissions with discharge.

Hospital re-admissions have been evaluated as an outcome measure for patients having measure of NP effectiveness of hospitalized patients in the research reviewed for this study. Re-hospitalization rates may be influenced by several aspects of care provided by NPs. It is noted that participants in this research may have been re-admitted to hospitals other than the one where the CABG procedure was performed. This would result in a decreased recognition of hospital re-admissions for the occurrence of infections.

The measurement of patient outcomes remains an important indicator of hospital quality (Clancy & Eisenberg, 1998). The outcomes adverse events, and mortality, and hospital re-admissions are most often considered medical outcomes, and responsive to medical interventions but are more recently considered an aspect of nursing care (Kurtzman & Corrigan, 2007). The role of the NP has been described as providing a combination of traditional medical care and nursing care services, making these measure an important measure of effectiveness for NPs. The outcomes measured in this study reflect common quality measures associated with CABG surgery (Cardiac Surgery, 2008). Outcomes for patients who receive care from NPs in hospitals for specific conditions need to be described.
Research Question 4

The role of the Nurse Practitioner was primarily as direct care provider in this study. The majority of time was spent performing direct patient care activities; making rounds on patients, monitoring patients, and reviewing diagnostic studies, performing teaching. Collaboration with the health care team and patient/family teaching were also reported to be common roles. NPs have been reported to function in the role of advanced practice nursing and medicine and the description of activities of the NP providers in this study reflect those functions. The tool used to measure the dose of the NP in this study, only provided general information about frequency of functions that NPs performed weekly. This lack of precision, along with the small number of NPs in this study, does not allow any conclusions to be reached.

However, the general descriptions provided by the NPs in this research are consistent with research findings. Carroll, et al. (2001) and Jensen and Scherr (2004) found that NPs spent the majority of time providing direct patient care. Kleinpell (1998, 1999, 2005; Kleinpell-Nowell, 1999) also described the usual care activities that NPs provide for patients as a majority of direct care activities.

This information should also be placed into the context of the theoretical used for this study. The Quality Health Outcomes Model (QHOM) (Mitchell, et al., 1998) shows the relationship between care providers, patients, process activities, and outcomes. The unique knowledge and skills of this provider that impact patients in a specific setting, need further research. While the cost of care for patients in this study was lower than reported PA averages, and HRQOL MH scores for participants in this study showed no
impairment, no conclusions can be drawn related to the Nurse Practitioner; due to the nature of the study and number of NPs.

Conclusions

The following conclusions were derived from the results of this study:

1. Patient perceptions of the mental health component of quality of life had the highest scores in this study.
2. Patient perceptions of satisfaction with care were rated as very good to excellent for admission, daily care, keeping informed, nurses, doctors, other staff, living arrangements, leaving the hospital, and total satisfaction.
3. There was a high occurrence of adverse events and hospital re-admissions in this study probably consistent with the chronicity of illness and diabetes in the study population.
4. The cost of care for participants was lower than the PA averages for CABG surgery.
5. There was a low incidence of mortality for patients in this study.
6. NPs primarily performed direct patient care patient activities.

Limitations

Limitations to this study have been identified related to the research design and sample size. This research was a descriptive design used to: explore perceptions of
patients related to health related quality of life and satisfaction with care post CABG surgery; patient outcomes post CABG surgery; and the role of the NP for the care of CABG patients. This type of study was performed because of the gap in the literature related to the variables of interest. The findings are an initial step that can be used to generate additional research questions or hypotheses. There was no comparison group used in this study which limited the type of analyses that could be performed. Another limitation was the small number of NPs in the study. There were two NPs (one at each hospital) that provided the care to all study participants. This provided a limited view of how NPs implement the role for the care of patients hospitalized for CABG surgery and limited data analysis about the NP. Descriptive statistics were the primary method for data analysis which resulted in limited conclusions.

**Implications**

There are some important implications of the study findings for nursing science and health care. Since this study was descriptive, it provided an initial understanding about patient perceptions about HRQOL and patient satisfaction, viewed as patient preferences and patient-centered outcomes. Participants in this study had mean scores for perceived mental health that were similar to population norms for individuals with heart disease. These results occurred despite the high rate of adverse events and hospital re-admissions prior to the measure, which was taken four weeks after hospital discharge. Additionally, patient perceptions of satisfaction with care were rated very good to excellent, with total satisfaction, nurses, and daily care receiving the highest scores.
Additional investigation of these findings is warranted. These measures were considered patient-centered measures of quality health care. Further investigations that offer explanations of these findings would be beneficial to health care agencies and providers of care. Studies using quasi-experimental designs, with a larger sample of patients, and NPs would add additional information. Hypotheses that could be generated from this research are: 1) Perceptions of HRQOL-MH for patients who have CABG surgery are positively correlated with the use of NPs as direct care providers; 2) Perceptions of satisfaction for patients who have CABG surgery are positively correlated with the use of NPs as direct care providers.

The outcomes in this study showed a high rate of adverse events and hospital re-admissions; while the cost of care, and mortality rates were low for study participants. While no conclusions can be drawn from this study, Huck (2008) warned that researchers should consider the practical significance of research findings. The findings of this study represent a sample of patients who had a high cost, high frequency condition, had perceptions of satisfaction that were very good to excellent, had average mental health scores comparable to the general population with heart disease, and had low costs for their surgical stay, and low mortality when compared with state of PA mortality rates. Additional information is needed to identify factors that may have influenced these results, using more rigorous methodology and statistical analyses. Measuring the presence of other co-morbidities, or total number of co-morbidities may explain the incidence of adverse events or hospital re-admissions.
The findings related to study participants perceptions of mental health, perceptions of satisfaction, cost of care, and mortality would also benefit from further research and analysis.

Since patients in hospitals are exposed to many risks related to their clinical condition, personal risk factors, the processes of care, and knowledge and skills of providers (Mitchell, et al. 1998), information about factors that help to decrease adverse events and hospital re-admission are important considerations for future study. Conversely, it is also important to identify and study other variables that may be more directly or significantly impacted by NP care.

There are implications related to the role of the NP in this study. While there were only two NPs in this study, they provided important information on their role care activities in a specific health care setting. While these findings are consistent with other research (Carroll, et al. (2001; Jensen and Scherr, 2004 Kleinpell, (1998, 1999, 2005; Kleinpell-Nowell; 1999) additional information is needed. The tool that was used in this research asked general questions about daily NP care. A tool that provides more precision may be needed for future studies of NPs such as asking questions related to describing the amount of time spent in each activity with a particular population of patients, since it is recommended that patient preferences be considered when care is delivered (IOM, 2001). This would assist researchers to take the next step; identification of what roles or activities actually impact patient care outcomes.

Additionally, NPs may need to have a better understanding of patient perceptions and the impact those perceptions may have on quality of life and outcomes, wherever they practice. NPs spend the majority of time in direct patient care. This can take the
form of performing tasks, writing orders, writing progress notes, or other aspects of direct care. NPs spend less time providing education, counseling, and conducting research. As NPs understand patients preferences, they may need to adjust the amount of time that they spend providing services to the patients that they serve.

Finally, the Quality Health Outcomes Model (QHOM) (Mitchell, et al., 1998) served as an appropriate guide in the selection of variables for this research. It demonstrated the complex nature of health care in the quest for quality. Additional research using the model may further refine the model.

**Recommendations**

Recommendations related to education, clinical practice, and nursing research have been identified. These relate to the care of patients in hospitals, the knowledge and skills of providers, and the identification and measurement of the role and effectiveness provided by Nurse Practitioners (NPs). The education of NPs includes advanced practice skills and knowledge needed to care for patients in a variety of health care settings, including hospitals. NP education currently identifies domains of core competency that include management of patient health/illness, the NP-patient relationship, teaching, and monitoring and ensuring quality health care (NONPF, 2006). These domains focus on the ability of NPs to deliver high-quality, patient-centered care. This basis for NP practice, while often taught in NP programs, may quickly be replaced with the usual daily activities of NPs identified in the literature. NP education may need to re-focus strategies which enhance the NP’s unique contribution to health care; not only on direct care, but on
those aspects of care that are unique to the NP role. The NP role as a patient/family teacher, who delivers patient-centered care, with the preferences of patients needs to become more of a priority. Other competencies for NPs need to be strengthened, such as monitoring quality of care and for effective outcomes. One method to assist in this re-focusing of care may be to utilize a theoretical model for programs that incorporates all components of the health care system that influences patient outcomes.

Similar recommendations may be made for NPs in clinical practice. The health care system, providers, and patients are focused on quality. NPs should consider the types of activities that they perform daily, with renewed attention to patient preferences. Spending added time with patients in the role of educator and counselor has the potential to benefit the patient, as well as the NP. NPs should also become more active research participants, identifying particular types of patients, conditions, or environments that appear to benefit from NPs. NPs, through their daily interactions with patients in clinical settings are uniquely qualified to address these issues.

There are also implications related to nursing research. As health care changes, the sites where patients are seen will also change. Continued research to describe the role of NPs in all sites where they practice is still needed. The next logical step would be to identify which particular role function of the NP impacts patient care the greatest; and for what specific populations and settings. Patient preferences should always be considered. Additionally, nurse scientists need to utilize quantitative methods, selecting appropriate outcomes measures that demonstrate the effect of the NP. A future direction for research, based on the findings from this study, are a next-step study using a quasi-experimental
design, with a NP intervention to test the impact of the NP role on selected patient-centered and population specific outcomes.

**Chapter Summary**

A renewed focus on quality health care focused the attention of patients, providers, health care facilities, and the government on recommending changes to improve patient outcomes (Adams & Corrigan, 2003; Department of Health and Human Services, 2005; IOM, 2001; Kohn et al., 2000). A new focus has been placed on providing patient centered care, considering patient preferences (IOM, 2001). Patients with high frequency, complex, high cost health problems are being cared for in hospitals by a variety of providers. NPs are one type of provider caring for patients in hospitals. It has become necessary to identify patient preferences for care and appropriate outcomes for patients using all types of providers. Participants in this study had high perceptions of satisfaction with care, average perceptions of mental health, low mortality, and low costs for the CABG procedure, when cared for by NPs. They also had a high occurrence of adverse events and hospital re-admissions, when cared for by NPs. Further research is warranted to provide additional description of patients, outcomes, and the role of NPs in the care of patients in hospitals.
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Appendix A

Health Related Quality of Life Survey

Your Health and Well-Being

This survey asks for your views about your health. This information will help keep track of how you feel and how well you are able to do your usual activities. Thank you for completing this survey!

For each of the following questions, please mark an ☐ in the one box that best describes your answer.

1. In general, would you say your health is:

<table>
<thead>
<tr>
<th>Excellent</th>
<th>Very good</th>
<th>Good</th>
<th>Fair</th>
<th>Poor</th>
</tr>
</thead>
<tbody>
<tr>
<td>▼</td>
<td>▼</td>
<td>▼</td>
<td>▼</td>
<td>▼</td>
</tr>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

2. Compared to one year ago, how would you rate your health in general now?

<table>
<thead>
<tr>
<th>Much better now than one year ago</th>
<th>Somewhat better now than one year ago</th>
<th>About the same as one year ago</th>
<th>Somewhat worse now than one year ago</th>
<th>Much worse now than one year ago</th>
</tr>
</thead>
<tbody>
<tr>
<td>▼</td>
<td>▼</td>
<td>▼</td>
<td>▼</td>
<td>▼</td>
</tr>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>
3. The following questions are about activities you might do during a typical day. Does your health now limit you in these activities? If so, how much?

<table>
<thead>
<tr>
<th>Yes, limited a lot</th>
<th>Yes, limited a little</th>
<th>No, not limited at all</th>
</tr>
</thead>
</table>

a. Vigorous activities, such as running, lifting heavy objects, participating in strenuous sports

b. Moderate activities, such as moving a table, pushing a vacuum cleaner, bowling, or playing golf

c. Lifting or carrying groceries

d. Climbing several flights of stairs

e. Climbing one flight of stairs

f. Bending, kneeling, or stooping

g. Walking more than a mile

h. Walking several hundred yards

i. Walking one hundred yards

j. Bathing or dressing yourself
4. During the past 4 weeks, how much of the time have you had any of the following problems with your work or other regular daily activities as a result of your physical health?

<table>
<thead>
<tr>
<th>All of the time</th>
<th>Most of the time</th>
<th>Some of the time</th>
<th>A little of the time</th>
<th>None of the time</th>
</tr>
</thead>
<tbody>
<tr>
<td>▼</td>
<td>▼</td>
<td>▼</td>
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<td>▼</td>
</tr>
</tbody>
</table>

a. Cut down on the amount of time you spent on work or other activities ................. [ ] 1 [ ] 2 [ ] 3 [ ] 4 [ ] 5

b. Accomplished less than you would like .......... [ ] 1 [ ] 2 [ ] 3 [ ] 4 [ ] 5

c. Were limited in the kind of work or other activities ........................................ [ ] 1 [ ] 2 [ ] 3 [ ] 4 [ ] 5

d. Had difficulty performing the work or other activities (for example, it took extra effort) ......................................................... [ ] 1 [ ] 2 [ ] 3 [ ] 4 [ ] 5

5. During the past 4 weeks, how much of the time have you had any of the following problems with your work or other regular daily activities as a result of any emotional problems (such as feeling depressed or anxious)?

<table>
<thead>
<tr>
<th>All of the time</th>
<th>Most of the time</th>
<th>Some of the time</th>
<th>A little of the time</th>
<th>None of the time</th>
</tr>
</thead>
<tbody>
<tr>
<td>▼</td>
<td>▼</td>
<td>▼</td>
<td>▼</td>
<td>▼</td>
</tr>
</tbody>
</table>

a. Cut down on the amount of time you spent on work or other activities ......................................................... [ ] 1 [ ] 2 [ ] 3 [ ] 4 [ ] 5

b. Accomplished less than you would like .......... [ ] 1 [ ] 2 [ ] 3 [ ] 4 [ ] 5

c. Did work or other activities less carefully than usual ............................................................................................................. [ ] 1 [ ] 2 [ ] 3 [ ] 4
6. During the past 4 weeks, to what extent has your physical health or emotional problems interfered with your normal social activities with family, friends, neighbors, or groups?

<table>
<thead>
<tr>
<th>Not at all</th>
<th>Slightly</th>
<th>Moderately</th>
<th>Quite a bit</th>
<th>Extremely</th>
</tr>
</thead>
<tbody>
<tr>
<td>▼</td>
<td>▼</td>
<td>▼</td>
<td>▼</td>
<td>▼</td>
</tr>
</tbody>
</table>

☐ 1       ☐ 2       ☐ 3       ☐ 4       ☐ 5

7. How much bodily pain have you had during the past 4 weeks?

<table>
<thead>
<tr>
<th>None</th>
<th>Very mild</th>
<th>Mild</th>
<th>Moderate</th>
<th>Severe</th>
<th>Very Severe</th>
</tr>
</thead>
<tbody>
<tr>
<td>▼</td>
<td>▼</td>
<td>▼</td>
<td>▼</td>
<td>▼</td>
<td>▼</td>
</tr>
</tbody>
</table>

☐ 1       ☐ 2       ☐ 3       ☐ 4       ☐ 5       ☐ 6

8. During the past 4 weeks, how much did pain interfere with your normal work (including both work outside the home and housework)?

<table>
<thead>
<tr>
<th>Not at all</th>
<th>A little bit</th>
<th>Moderately</th>
<th>Quite a bit</th>
<th>Extremely</th>
</tr>
</thead>
<tbody>
<tr>
<td>▼</td>
<td>▼</td>
<td>▼</td>
<td>▼</td>
<td>▼</td>
</tr>
</tbody>
</table>

☐ 1       ☐ 2       ☐ 3       ☐ 4       ☐ 5
9. These questions are about how you feel and how things have been with you during the past 4 weeks. For each question, please give the one answer that comes closest to the way you have been feeling. How much of the time during the past 4 weeks...

<table>
<thead>
<tr>
<th>All of the time</th>
<th>Most of the time</th>
<th>Some of the time</th>
<th>A little of the time</th>
<th>None of the time</th>
</tr>
</thead>
<tbody>
<tr>
<td>▼</td>
<td>▼</td>
<td>▼</td>
<td>▼</td>
<td>▼</td>
</tr>
</tbody>
</table>

a) Did you feel full of life? ........................................... □ 1 ........ □ 2 ....... □ 3 ....... □ 4 ....... □ 5  
b) Have you been very nervous? ........................................... □ 1 ........ □ 2 ....... □ 3 ....... □ 4 ....... □ 5  
c) Have you felt so down in the dumps that nothing could cheer you up?  

| □ 1 ........ □ 2 ....... □ 3 ....... □ 4 ....... □ 5  

| □ 1 ........ □ 2 ....... □ 3 ....... □ 4 ....... □ 5  

d) Have you felt calm and peaceful? ..................................... □ 1 ........ □ 2 ....... □ 3 ....... □ 4 ....... □ 5  
e) Did you have a lot of energy? ........................................... □ 1 ........ □ 2 ....... □ 3 ....... □ 4 ....... □ 5  
f) Have you felt downhearted and depressed? ........................ □ 1 ........ □ 2 ....... □ 3 ....... □ 4 ....... □ 5  
g) Did you feel worn out? ..................................................... □ 1 ........ □ 2 ....... □ 3 ....... □ 4 ....... □ 5  
h) Have you been happy? ...................................................... □ 1 ........ □ 2 ....... □ 3 ....... □ 4 ....... □ 5  
i) Did you feel tired? .......................................................... □ 1 ........ □ 2 ....... □ 3 ....... □ 4 ....... □ 5  

10. During the past 4 weeks, how much of the time has your physical health or emotional problems interfered with your social activities (like visiting friends, relatives, etc.)?

<table>
<thead>
<tr>
<th>All of the time</th>
<th>Most of the time</th>
<th>Some of the time</th>
<th>A little of the time</th>
<th>None of the time</th>
</tr>
</thead>
<tbody>
<tr>
<td>▼</td>
<td>▼</td>
<td>▼</td>
<td>▼</td>
<td>▼</td>
</tr>
<tr>
<td>□ 1</td>
<td>□ 2</td>
<td>□ 3</td>
<td>□ 4</td>
<td>□ 5</td>
</tr>
</tbody>
</table>
11. How TRUE or FALSE is **each** of the following statements for you?

<table>
<thead>
<tr>
<th>Definitely true</th>
<th>Mostly true</th>
<th>Don't know</th>
<th>Mostly false</th>
<th>Definitely false</th>
</tr>
</thead>
<tbody>
<tr>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
</tbody>
</table>

a  I seem to get sick a little easier than other people

b  I am as healthy as anybody I know

c  I expect my health to get worse

d  My health is excellent

**THANK YOU FOR COMPLETING THESE QUESTIONS!**

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Appendix B

Satisfaction Survey: The Patient Judgment System

Your Satisfaction with the Hospital

This survey asks for your views about your satisfaction with your hospital stay. Thank you for completing this survey!

Directions: For each of the following questions, please circle the number that corresponds with your answer.

Admission: Entering the Hospital

1. Efficiency of the admitting procedure: ease of getting admitted including the amount of time it took.

<table>
<thead>
<tr>
<th>Excellent</th>
<th>Very good</th>
<th>Good</th>
<th>Fair</th>
<th>Poor</th>
<th>Does Not Apply</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
</tbody>
</table>

2. Attention of admitting staff to your individual needs: Their handling of your personal needs and wants.

<table>
<thead>
<tr>
<th>Excellent</th>
<th>Very good</th>
<th>Good</th>
<th>Fair</th>
<th>Poor</th>
<th>Does Not Apply</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
</tbody>
</table>

Your Daily Care in the Hospital

1. Sensitivity to problems: Sensitivity of hospital staff to your special problems or concerns.

<table>
<thead>
<tr>
<th>Excellent</th>
<th>Very good</th>
<th>Good</th>
<th>Fair</th>
<th>Poor</th>
<th>Does Not Apply</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
</tbody>
</table>

2. Coordination of care: The teamwork of all the hospital staff who took care of you.

<table>
<thead>
<tr>
<th>Excellent</th>
<th>Very good</th>
<th>Good</th>
<th>Fair</th>
<th>Poor</th>
<th>Does Not Apply</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
</tbody>
</table>
**Keeping You Informed**

1. Ease of getting information: Willingness of hospital staff to your special needs or concerns.

<table>
<thead>
<tr>
<th>Excellent</th>
<th>Very good</th>
<th>Good</th>
<th>Fair</th>
<th>Poor</th>
<th>Does Not Apply</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
</tbody>
</table>

2. Instructions: How well nurses and other staff explained about tests, treatments and what to expect.

<table>
<thead>
<tr>
<th>Excellent</th>
<th>Very good</th>
<th>Good</th>
<th>Fair</th>
<th>Poor</th>
<th>Does Not Apply</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
</tbody>
</table>

3. Informing family or friends: How well they were kept informed about your condition and needs.

<table>
<thead>
<tr>
<th>Excellent</th>
<th>Very good</th>
<th>Good</th>
<th>Fair</th>
<th>Poor</th>
<th>Does Not Apply</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
</tbody>
</table>

**Your Nurses**

1. Attention of nurses to your condition: How often nurses checked on you to keep track of how you were doing.

<table>
<thead>
<tr>
<th>Excellent</th>
<th>Very good</th>
<th>Good</th>
<th>Fair</th>
<th>Poor</th>
<th>Does Not Apply</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
</tbody>
</table>

2. Nursing staff response to your calls: How quick they were to help.

<table>
<thead>
<tr>
<th>Excellent</th>
<th>Very good</th>
<th>Good</th>
<th>Fair</th>
<th>Poor</th>
<th>Does Not Apply</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
</tbody>
</table>

**Your Doctor**
1. Attention of doctor to your condition: How often doctors checked on you to keep track of how you were doing.

<table>
<thead>
<tr>
<th>Excellent</th>
<th>Very good</th>
<th>Good</th>
<th>Fair</th>
<th>Poor</th>
<th>Does Not Apply</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
</tbody>
</table>

2. Information given by doctors: Amount of information you were given about your illness and treatment; what to do after leaving the hospital.

<table>
<thead>
<tr>
<th>Excellent</th>
<th>Very good</th>
<th>Good</th>
<th>Fair</th>
<th>Poor</th>
<th>Does Not Apply</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
</tbody>
</table>

**Other Hospital Staff**

1. Housekeeping staff: How well they did their jobs and how they acted towards you.

<table>
<thead>
<tr>
<th>Excellent</th>
<th>Very good</th>
<th>Good</th>
<th>Fair</th>
<th>Poor</th>
<th>Does Not Apply</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
</tbody>
</table>

2. Laboratory staff: How well they did their jobs and how they acted towards you.

<table>
<thead>
<tr>
<th>Excellent</th>
<th>Very good</th>
<th>Good</th>
<th>Fair</th>
<th>Poor</th>
<th>Does Not Apply</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
</tbody>
</table>

3. IV starters: Skill of staff who started your IV.

<table>
<thead>
<tr>
<th>Excellent</th>
<th>Very good</th>
<th>Good</th>
<th>Fair</th>
<th>Poor</th>
<th>Does Not Apply</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
</tbody>
</table>

**Living Arrangements**

1. Restfulness of atmosphere: Amount of peace and quiet.

<table>
<thead>
<tr>
<th>Excellent</th>
<th>Very good</th>
<th>Good</th>
<th>Fair</th>
<th>Poor</th>
<th>Does Not Apply</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
</tbody>
</table>

2. Hospital building: How you would rate the hospital building overall.
Discharge: Leaving the Hospital

1. Discharge procedures: Time it took to be discharged from the hospital and how efficiently it was handled.

2. Discharge instructions: How clearly and completely you were told what to do and what to expect when you left the hospital.

Billing by Hospital

1. Efficiency of billing: How fast you got your bill, how accurate and understandable it was.

2. Explanations about costs and how to handle your hospital bills: The completeness and accuracy of information and the willingness of hospital to answer your questions about finances.

Return
1. Would you return to this hospital if you needed to be hospitalized again?

<table>
<thead>
<tr>
<th>Definitely</th>
<th>Probably</th>
<th>Probably</th>
<th>Definitely</th>
<th>Does Not</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>Apply</td>
</tr>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

(Does not apply: for example: because I do not live near the hospital)

Appendix C

Chart Review Tool

<table>
<thead>
<tr>
<th>Demographic Data</th>
<th>Hospital Data</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age:</strong> ______</td>
<td><strong>Surgeon:</strong> __________</td>
</tr>
<tr>
<td><strong>Gender:</strong></td>
<td><strong>Date of Admission to Hospital:</strong> ______</td>
</tr>
<tr>
<td>Male ___     Female ____</td>
<td><strong>Date of Surgery:</strong> ______</td>
</tr>
<tr>
<td>Direct Hospital Charges: ______</td>
<td><strong>Date of Discharge from Hospital:</strong> _____</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Pre-Operative Data</th>
<th>Previous Cardiac Surgery</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Priority of Surgery</strong></td>
<td>( ) Yes</td>
</tr>
<tr>
<td>( ) Elective-SDA or Non-urgent</td>
<td>( ) Previous CABG</td>
</tr>
<tr>
<td>( ) Urgent &lt; 72 hrs from event</td>
<td>( ) Previous Valve</td>
</tr>
</tbody>
</table>
| ( ) Emergent < 12 hrs from event | Date of last surgery ___/___/_____

<table>
<thead>
<tr>
<th>Co-Morbidities</th>
<th>( ) No</th>
</tr>
</thead>
<tbody>
<tr>
<td>( ) Diabetes</td>
<td></td>
</tr>
<tr>
<td>( ) Hypertension</td>
<td></td>
</tr>
<tr>
<td>( ) Hypercholesterolemia</td>
<td></td>
</tr>
<tr>
<td>( ) Smoking</td>
<td></td>
</tr>
<tr>
<td>( ) ACS</td>
<td></td>
</tr>
<tr>
<td>( ) MI</td>
<td></td>
</tr>
<tr>
<td>( ) CHF</td>
<td></td>
</tr>
<tr>
<td>Operative Information</td>
<td>Adverse Events</td>
</tr>
<tr>
<td>----------------------------</td>
<td>--------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Type of Surgery:</td>
<td>Sternal Wound Infection YES ( ) NO ( )</td>
</tr>
<tr>
<td>Number of Distal Anastomoses ____</td>
<td>Leg or arm incision infection YES ( ) NO ( )</td>
</tr>
<tr>
<td>Number of Arterial Distals  ____</td>
<td>Pulmonary infection YES ( ) NO ( )</td>
</tr>
<tr>
<td></td>
<td>Urinary tract infection YES ( ) NO ( )</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Adverse Events</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sternal Wound Infection YES ( ) NO ( )</td>
</tr>
<tr>
<td>Leg or arm incision infection YES ( ) NO ( )</td>
</tr>
<tr>
<td>Pulmonary infection YES ( ) NO ( )</td>
</tr>
<tr>
<td>Urinary tract infection YES ( ) NO ( )</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>COMPLICATIONS</th>
<th>DISCHARGE INFORMATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Did the patient have an unscheduled return to surgery? YES ( ) NO ( )</td>
<td>( ) Home</td>
</tr>
<tr>
<td>Reason for return to Surgery:</td>
<td>( ) Rehab</td>
</tr>
<tr>
<td>( ) Wound Infection:</td>
<td>( ) SNF</td>
</tr>
<tr>
<td>( ) Sternal wound</td>
<td>( ) Transitional Care</td>
</tr>
<tr>
<td>( ) Leg wound</td>
<td>( ) Transferred to another acute care facility</td>
</tr>
<tr>
<td>( ) Redo surgery</td>
<td>( ) Expired</td>
</tr>
<tr>
<td>( ) Other ______________</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>DISCHARGE INFORMATION</th>
<th>COST OF CARE</th>
</tr>
</thead>
<tbody>
<tr>
<td>( ) Home</td>
<td>Total Amount Billed: Direct Costs</td>
</tr>
<tr>
<td>( ) Rehab</td>
<td>$ _____________</td>
</tr>
<tr>
<td>( ) SNF</td>
<td></td>
</tr>
<tr>
<td>( ) Transitional Care</td>
<td></td>
</tr>
<tr>
<td>( ) Transferred to another acute care facility</td>
<td></td>
</tr>
<tr>
<td>( ) Expired</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>30 DAYS POST HOSPITALIZATION</th>
<th>COST OF CARE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Was patient readmitted to the hospital ≤30 days from the procedure? YES ( ) NO ( )</td>
<td>Total Amount Billed: Direct Costs</td>
</tr>
<tr>
<td></td>
<td>$ _____________</td>
</tr>
<tr>
<td>Did the patient expire after discharge but within 30 days of the procedure? YES ( ) NO ( )</td>
<td></td>
</tr>
</tbody>
</table>

Date Completed:
Appendix D

Nurse Practitioner Survey

Instructions: Please complete the information with as much detail as possible. The first section of the questionnaire includes information about your current position and educational background. The second section requests information about your role as an NP in your current position.

1. Hospital: _____________
2. Employed by: Hospital: _____________ Cardiac Surgeon: _____________
   Other (please specify): __________________
3. Highest Degree Currently Held: Masters ____ PhD _______ DNP _______
   Other (please specify): __________________
4. NP Education Program: Adult NP _______ Family NP _______
   Acute Care NP _______ Geriatric NP ______
   Other (please specify type) ______________
5. Do you currently hold National Certification? Yes ____ No _____
   If Yes: Certifying Agency: ANCC _______ ACNP _______
   Other (please specify): ______________
6. How long have you been working in your current position (be as specific as possible)? ___________
7. How many years have you been an NP? _____________
8. Staff caring for patients include (select all that apply):

   [] Residents
   [] Specialty fellows
   [] Attending physicians
   [] Intensivist
   [] Physician assistants
   [] Other (please specify)__________________________

9. What is the percent of time you spend in clinical patient care? _____
10. If not 100%, what other responsibilities are part of your position?

   [] Administrative            [] Program Development
   [] Teaching                [] Quality Assurance
   [] Research                [] Department Projects
   [] Other (please specify)__________________________

11. If you write orders, must the orders be first cleared with an M.D.?
12. Do you utilize practice protocols?

[ ] Yes   [ ] No

13. Are you credentialed in your institution?

[ ] Yes   [ ] No (GO TO QUESTION 16)

14. How did you receive your credentialing?

[ ] Through the Department/Division of Nursing
[ ] Through the Department/Division of Medicine
[ ] Through the Human Resources Department/Division
[ ] Other (please specify)___________________________

15. For the following procedures/activities list, please place a check next to those that you currently do in your practice. For those that do not apply, please leave blank. Estimate the number of times you perform these procedures weekly.

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Check if Procedure Performed</th>
<th>Indicate Number of Times Perform this Procedure per week</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seeing patient</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Performing History and Physical</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ordering Lab Studies</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ordering X-ray Studies</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interpreting Lab or X-ray Studies</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coordination of discharge plans</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Monitoring patient progress</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Collaborating with members of the health care team</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Initiate specialty consultations</td>
<td></td>
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<tr>
<td>Institute and adjust IV therapy</td>
<td></td>
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<tr>
<td>Perform endotracheal intubations</td>
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<tr>
<td>Manage ventilated patients</td>
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<tr>
<td>Initiate central venous catheters</td>
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<tr>
<td>Insert chest tubes</td>
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<tr>
<td>Initiate arterial catheters</td>
<td></td>
<td></td>
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<tr>
<td>Examine and clean wounds</td>
<td></td>
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<tr>
<td>Perform incisions and drainage</td>
<td></td>
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<tr>
<td>Task</td>
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<td>------------------------------------------</td>
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<tr>
<td>Perform wound care and debridement</td>
<td></td>
<td></td>
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<tr>
<td>Perform patient/family teaching</td>
<td></td>
<td></td>
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<tr>
<td>Give nursing in-services</td>
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<tr>
<td>Initiate QI/QA studies</td>
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<tr>
<td>Work as a case manager</td>
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</tr>
<tr>
<td>Other (please specify)</td>
<td></td>
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</tr>
</tbody>
</table>

You have completed all the questions - Thank You!

Appendix E

Hospital Instrument

Hospital Name: ___________

Number of Licensed Beds: ___________

Number of Open Beds: ___________

Current Magnet Status: Yes ______ No ______

Number of Cardiac Surgeons: ___________

Number of Cardiac Surgeries Performed in 2007: ___________

Nurse/Patient Ratio: ICU ___________ Cardiac Step-down ______

Use of Clinical Pathways Yes ___ No ___

Use of Standing Orders Yes ___ No ___

Use of Resident Physicians Yes ___ No ___

Any other special processes of care used for CABG Patients: Please describe:

Name of individual/position completing this information: ______________________

Date Completed: _____________
Appendix F

Pennsylvania State University Office for Research Protections IRB Approval

Subject: Results of Review of Proposal - Expedited (IRB #29801)

Approval Expiration Date: November 16, 2009

“The Effectiveness of Nurse Practitioners with Coronary Artery Bypass Surgery Patients: A Descriptive Correlational Study”

The Social Science Institutional Review Board (IRB) has reviewed and approved your proposal for use of human participants in your research. By accepting this decision, you agree to obtain prior approval from the IRB for any changes to your study. Unanticipated participant events that are encountered during the conduct of this research must be reported in a timely fashion.

Enclosed is/are the dated, IRB-approved informed consent(s) to be used when recruiting participants for this research. Participants must receive a copy of the approved informed consent form to keep for their records.

If signed consent is obtained, the principal investigator is expected to maintain the original signed consent forms along with the IRB research records for this research at least three (3) years after termination of IRB approval. For projects that involve protected health information (PHI) and are regulated by HIPAA, records are to be maintained for six (6) years. The principal investigator must determine and adhere to additional requirements established by the FDA and any outside sponsors.
If this study will extend beyond the above noted approval expiration date, the principal investigator must submit a completed Continuing Progress Report to the Office for Research Protections (ORP) to request renewed approval for this research.

On behalf of the IRB and the University, thank you for your efforts to conduct your research in compliance with the federal regulations that have been established for the protection of human participants.
Appendix G

Patient Enrollment Verbal Script

Hello, My name is Patricia Sweeney and I am a doctoral student in nursing at Penn State. I am conducting research as part of the requirement for the completion of my doctoral degree in nursing. I am interested in studying the relationship between the use of Nurse Practitioners for patients who are in the hospital for open heart surgery (also called coronary artery bypass surgery) and certain outcomes. I am asking that you consider helping me complete this project by becoming a participant. I have spoken with the surgeons at this hospital and I have their permission and support for this research. I will not interfere with any of your care while you are in the hospital. I will ask for permission to look at your hospital record after your surgery is complete and I will also ask you to complete two questionnaires when you go home.

If you think you may be interested in participating in this research, I will give you additional information today that may help you to decide. If at any time, you would like additional information, please contact me at 570-881-5483.

Thank you for considering helping me in the completion of this important project.

Patricia Sweeney
Doctoral Candidate in Nursing
Penn State University
570-963-2647 (work)
570-881-5483 (cell)
Appendix H

Patient Screening Questions

I need to ask you some questions that will help me determine if you are eligible for the research. Could you tell me:

Name_______

1. What is your date of birth? ________ (if ≤ 18, ineligible)

2. Do you know what type of surgery are you scheduled for or had?
   A. Bypass surgery ______ (if yes, go to #2)
   B. Valve replacement ______ (if valve surgery, ineligible)
Appendix I

Participant Consent

Informed Consent Form for Biomedical Research
The Pennsylvania State University

Title of Project: The Effectiveness of Nurse Practitioners with Patients having Coronary Artery Bypass Grafting Surgery: A Descriptive Correlational Study

Principal Investigator: Patricia Sweeney R.N., M.S., C.R.N.P.
Doctoral Student, Nursing
6 David Terrace
Scranton, PA 18505
570-881-5483 (cell) or 570-963-2647 (office)
pxs29@psu.edu

Advisor: Mona Counts PhD, R.N., C.R.N.P
201 Health and Human Development East
University Park, PA 16802
814-863-0245
mmc18@psu.edu

You are being asked to participate in a research study. The purpose of this research is to look at the relationship between the use of Nurse Practitioners for patients having open heart surgery (coronary artery bypass grafting surgery) and patient outcomes. You will receive the usual medical care directed by your physician while you are in the hospital. I will look at your hospital information after you go home. This will include your hospital chart, hospital charges, and any unexpected re-admission to the hospital. There will be 100 people in this study.

You will also be asked to complete two survey questionnaires one month after you leave the hospital. You will need to complete two surveys (questionnaires). You will receive a packet of information when you are discharged from the hospital or this packet will be mailed to your home. This packet will include information about the research study, the two survey questionnaires, and directions for completing the two surveys. You will also be given a self-addressed, stamped envelope to return the questionnaires to me. It should take you about 20 minutes to complete all of the questions in both surveys. One of the surveys has 20 questions (for satisfaction) and the second survey (for quality of life) has 36 questions (for a total of 56
questions). I will get information about your bill from the hospital finance or billing department. I will look at your hospital chart and for any hospital re-admissions six weeks after you leave the hospital.

There are no physical risks associated with participating in this research, beyond those experienced in everyday life. Some of the questions you will be asked are personal and might cause discomfort.

The benefits of participating may include personal satisfaction. You may benefit by sharing information about your hospital stay and how you feel one month after your hospital discharge. You may also help to identify how the use of Nurse Practitioners affects patients having open heart surgery.

Your participation in this research is confidential. The data will be stored and secured in an office at Penn State University in a locked file. Penn State’s Office for Research Protections, the Biomedical Institutional Review Board, and the Office for Human Research Protections in the Department of Health and Human Services may review records related to this research study. In the event of a publication or presentation resulting from the research, no personally identifiable information will be shared.

Personal information about you will be held in strictest confidence. Once your chart information and questionnaires have been completed, all personal identifiers will be removed from your records. Your name will be replaced with a code number. The original list that includes your name and code number will be placed in a locked file in a locked office at Penn State University. The only person who will be able to match your name to the code will be the researcher. All research records are required by Federal law to be kept for 6 years. All research records will be destroyed in August, 2015. All data that is stored until that time will have no personal identifiers attached.

You have the right to ask questions. For questions about your rights as a research participant, contact complete for Hospital A or Hospital B, Chairman of the Hospital Institutional Review Board (which is a group of people who review the research to protect your rights) at complete number for Hospital A or Hospital B

You may also contact the researcher Patricia Sweeney at (570) 963-2647 or (570) 881-5483 with questions or concerns about this research. You can also call this number if you feel this study has harmed you in any way. Questions about your rights as a research participant may also be directed to Penn State University’s Office for Research Protections at (814) 865-1775.

Payment for participation:

Your packet will include a $2 bill. This is a small token of my appreciation of your participation in this research.
Protected Health Information (HIPAA)

Health information about you will be collected because you are a part of this research study. By signing this form you are allowing the researcher groups listed in the next paragraph to use your health information. Your health information will only be used for this research. Your information will only be used as explained in the consent form or when required by law. The researcher may use the following sources of health information:

a. Your medical record about your admission for the heart bypass procedure. This record will be used for your demographic information (name, address, phone number, age and gender), medical history, type of surgical procedure performed, and any complications of the surgical procedure.

b. Your hospital charges as provided by the finance or business office.

c. Your medical record if you are re-admitted to the hospital within one month of your heart bypass surgery. This will include the reason for your re-hospitalization only.

Research records that identify you will be kept confidential as required by law. You will not be identified by name, social security number, address, phone number or any other direct personal identifier in research records given to someone outside of The Pennsylvania State University (PSU), except when required by law. For records shared outside of PSU, you will be assigned a code number. The list that matches your name with the code number will be kept in a locked file in the locked office of Patricia Sweeney.

Representatives of the following people/groups are allowed to use and share your health information with other specific groups in connection with this research study:

- The principal investigator, Patricia Sweeney, doctoral student;
- The Institutional Review Board of the hospital;
- The Penn State University Institutional Review Board/Office for Research Protections;

And, any other party authorized by law.

The researcher, Patricia Sweeney agrees to protect your health information by using and disclosing it only as permitted by you in this Authorization and as directed by state and federal law. Should the health information be disclosed by the researcher, to someone outside of this study, it may no longer be covered/protected by the federal regulation HIPAA.

Your permission for the use and sharing of your health information will expire upon completion of the research study. Research records are required by law to be kept for 6 years. All research records will be destroyed in August 2015. At that time the research information not already in your medical record will be destroyed.

Voluntary Participation:
Your decision to be in this research is voluntary. You can stop at any time. You do not have to answer any questions you do not want to answer. Refusal to take part in or withdrawing from this study will involve no penalty or loss of benefits you would receive otherwise.

If you wish to participate in this research, you must sign this form. If you do not want to participate, you will not be required to do so. You will continue to receive the standard medical care as decided by your physician.

You are free to withdraw your permission for the use and sharing of your health information, but you must do this in writing as indicated in the PSU Privacy Notice. If you do decide to withdraw, we ask that you contact Patricia Sweeney in writing and let her know that you are withdrawing from the research study. Her mailing address is: Patricia Sweeney
Penn State University
120 Ridge View Drive
Dunmore, PA 18512

If you revoke (withdraw) your permission, we will no longer use or share medical information about you for the reasons covered by your written authorization, except when the law allows us to continue using your information. We are unable to take back anything we have already done or shared with your permission, and we are required to keep our records of care for six years. All research records will be destroyed by shredding in August 2015.

You must be 18 years of age or older to consent to take part in this research study. If you agree to take part in this research study and the information outlined above, please sign your name and indicate the date below.

You will be given a copy of this signed and dated consent form for your records.

____________________________________________
Participant Signature                   Date

____________________________________________
Person Obtaining Consent               Date
Appendix J

Administrator Consent

Implied Consent Form for Biomedical Research
The Pennsylvania State University

Title of Project: The Effectiveness of Nurse Practitioners with patients having Coronary Artery Bypass Surgery: A Descriptive Correlational Study

Principal Investigator: Patricia Sweeney R.N. M.S., C.R.N.P.
Doctoral Student, Nursing
6 David Terrace
Scranton, PA 18505
(570) 881-5483 (cell) or (570) 963-2647 (office)
E-mail pxs29@psu.edu

Advisor: Dr. Mona Counts PhD, R.N., C.R.N.P.
201 Health and Human Development East
University Park, PA 16802
814-863-0245
E-mail: mmc18@psu.edu

You are being asked to participate in a research study. The purpose of this research is to look at the relationship between the use of Nurse Practitioners for patients having open heart surgery (coronary artery bypass grafting surgery) and patient outcomes.

You will be asked to complete a questionnaire that asks specific questions about the hospital characteristics about this hospital. You will also be asked some questions about the process of care for patients having coronary artery bypass graft surgery. This questionnaire has 10 questions and takes 5 minutes to complete. There are no risks in participating in this research beyond those experienced in everyday life. The benefits of participating in this research may include personal knowledge of helping to identify the relationship between Nurse Practitioners and outcomes for patients having coronary artery bypass surgery. This research could help determine how the use of Nurse Practitioners affects patient outcomes and how Nurse Practitioners are used in hospitals in the future.

Your participation in this research is confidential. The survey does not ask for any information that would identify who the responses belong to. Penn State’s Office for Research Protections, the Biomedical Institutional Review Board and the Office for Human Research Protections in the Department of Health and Human Services may review records related to this research study. In the event of any publication or presentation resulting from the
research, no personally identifiable information will be shared because your name is in no way linked to your responses.

Please contact Patricia Sweeney at 570-881-5483 or 570-963-2647 with questions, complaints or concerns about this research. You can also call this number if you feel this study has harmed you. Questions about your rights as a research participant may be directed to Penn State University’s Office for Research Protections at (814) 865-1775.

Your decision to be in this research is voluntary. You can stop at any time. You do not have to answer any questions you do not want to answer. Refusal to take part in or withdrawing from this study will involve no penalty or loss of benefits you would receive otherwise.

You must be 18 years of age or older to take part in this research study.

Completion and return of the survey implies that you have read the information in this form and consent to take part in the research.

Please keep this form for your records or future reference.
Appendix K

Nurse Practitioner Consent

Implied Consent Form for Biomedical Research

The Pennsylvania State University

Title of Project: The Effectiveness of Nurse Practitioners with patients having Coronary Artery Bypass Surgery: A Descriptive Correlational Study

Principal Investigator: Patricia Sweeney R.N. M.S., C.R.N.P.
Doctoral Student, Nursing
6 David Terrace
Scranton, PA 18505
(570) 881-5483 (cell) or (570) 963-2647 (office)
E-mail pxs29@psu.edu

Advisor: Dr. Mona Counts PhD, R.N., C.R.N.P.
201 Health and Human Development East
University Park, PA 16802
814-863-0245
E-mail: mmc18@psu.edu

You are being asked to participate in a research study. The purpose of this research is to look at the relationship between the use of Nurse Practitioners for patients having open heart surgery (coronary artery bypass grafting surgery) and patient outcomes.

You will be asked to complete a survey about your current job as a Nurse Practitioner. This survey has 15 questions and takes about 20 minutes to complete. There are no risks in participating in this research beyond those experienced in everyday life. Some of the questions are personal and might cause discomfort. The benefits of participating in this research may include personal knowledge of helping to identify the relationship between Nurse Practitioners and outcomes for patients having coronary artery bypass surgery. This research could help determine how the use of Nurse Practitioners affects patient outcomes and how Nurse Practitioners are used in hospitals in the future.

Your participation in this research is confidential. The survey does not ask for any information that would identify who the responses belong to. Penn State’s Office for Research Protections, the Biomedical Institutional Review Board and the Office for Human Research Protections in the Department of Health and Human Services may review records related to this research study. In the event of any publication or presentation resulting from the research, no personally identifiable information will be shared because your name is in no way linked to your responses.

Please contact Patricia Sweeney at 570-881-5483 or 570-963-2647 with questions, complaints or concerns about this research. You can also call this number if you feel this study
has harmed you. Questions about your rights as a research participant may be directed to Penn State University’s Office for Research Protections at (814) 865-1775.

Your decision to be in this research is voluntary. You can stop at any time. You do not have to answer any questions you do not want to answer. Refusal to take part in or withdrawing from this study will involve no penalty or loss of benefits you would receive otherwise.

You must be 18 years of age or older to take part in this research study.

Completion and return of the survey implies that you have read the information in this form and consent to take part in the research.

Please keep this form for your records or future reference.
Appendix L

Permission Letters

You are free to use this survey. Please make proper attribution if you choose to do so.

It was put in lit to promote its use by others.

On 11/5/07, Pat Sweeney <pxs29@psu.edu> wrote:

Dr. Nelson,

I'm a doctoral student in nursing at Penn State University and am interested in the Patient Judgment System short form that you described in the 1991 Medical Care article titled "Hospital Quality Trends." I cannot seem to locate any recent information about this tool through a library search (though I did locate 1 research article by Finkelstein, Harper, & Rosenthal, 1998 who used the tool) or through a search at the Hospital Corporation of America website. Is the tool currently being used? Could you provide me with information related to ownership and permission? Any information you can provide is appreciated.

Sincerely,
Patricia Sweeney, RN
Doctoral Student
Penn State University
pxs29@psu.edu

Eugene C. Nelson, DSc, MPH
Director Quality Administration
Dartmouth-Hitchcock Medical Center
Professor, Healthcare Improvement Leadership
The Dartmouth Institute for Health Policy and Clinical Practice
Dartmouth Medical School

One Medical Center Drive
Lebanon, NH 03756-0001

e-mail: eugene.c.nelson@gmail.com
www.clinicalmicrosystem.org
603 653 0457 or 603 653 0460 phone
603 653 0452 fax
At 10:23 PM 2/14/2008, you wrote:

Ok, thanks for clarifying Pat - I am teaching off campus the rest of the week and not back in the office until Monday, so I can send you the survey then for your review - as long as your intent is not to use the survey beyond your institutional focus, that is fine - I am working with the American Academy of NPs to conduct another national survey of ACNPs and would not want replication of the survey with larger national groups that might compete with our efforts.

Ruth

Ruth M. Kleinpell PhD. RN FAAN FAANP FCCM
Director, Center for Clinical Research and Scholarship
Rush University Medical Center;
Professor, Rush University College of Nursing
600 South Paulina Ave, 1062B AAC
Chicago, IL 60612
(312) 942-2320
fax: 773-929-1508
Ruth_M_Kleinpell@rush.edu

-----Pat Sweeney <pxs29@psu.edu> wrote: -----
To: Ruth_M_Kleinpell@rsh.net
From: Pat Sweeney <pxs29@psu.edu>
Date: 02/14/2008 08:53AM
Subject: Re:
Thanks for your Information on ACNP survey

At 10:48 PM 2/13/2008, you wrote:

Hi Pat,

Our survey was strictly one assessing aspects of ACNP positions - ie. salary, charactistics of the role - ie. unit vs. service based, hours worked, position components - ie. rounding, H&Ps, discharge planning, procedures, research, teaching, QI projects, satisfaction with the role and with MD collaboration, and some demographic questions - so, not sure it would be useful for you. Are you familiar with the study assessing ACNP effectiveness with cardiac surgery patients published by Susan Meyers and Linda Miers? IT was in AACN Clinical Issues several years ago- I know Susan, and she might have a more applicable survey or assessment tool - as well, Anna Gawlinaki has published on the ACNP role with cardiac surgery and CHF patients - keep me updated,

Ruth

Ruth M. Kleinpell PhD. RN FAAN FAANP FCCM
Director, Center for Clinical Research and Scholarship
Rush University Medical Center;
Professor, Rush University College of Nursing
600 South Paulina Ave, 1062B AAC
Chicago, IL 60612
(312) 942-2320
To: Ruth_M_Kleinpell@rsh.net  
From: Pat Sweeney <pxs29@psu.edu>  
Date: 02/13/2008 02:58PM  
Subject: Information on ACNP survey  

Dr. Kleinpell,  

I am a doctoral student in nursing at Penn State University. I have spoken to you in the past about your research involving ACNP practice and your longitudinal survey of acute care NPs. I am looking for a survey to use with NPs in my proposed study (effectiveness of NPs for patients having CABG surgery). I will be comparing an NP to non NP group on specific outcomes. I'm looking for a tool that will help me identify the type of practice/roles of the NPs who participate in patient care (as I'm interested in those who provide direct care vs those who are case managers). I have read your work and would like to know if you would be willing to provide me with the questionnaire and (if it is applicable) give me permission to use it in my study?  

Thank you for your time. I appreciate any assistance that will help in my proposed research.

Sincerely,  
Pat Sweeney  
Doctoral Student  
Penn State University  
570-963-2647  
pxs29@psu.edu

Dear Ms Sweeney  

Thank you for your email request. Permission is granted for you to use the material below for your thesis subject to the usual acknowledgements and on the understanding that you will reapply for permission if you wish to distribute or publish your thesis commercially.

Good luck!  

Best Wishes  
Zoë  

Zoë Ellams (Miss)  
Permissions Coordinator  
Blackwell Publishing  
9600 Garsington Road  
Oxford  
OX4 2DQ
Tel: 00 44 1865 476149  
Fax: 00 44 1865 471149

All future permission requests should be sent to mailto:journalsrights@oxon.blackwellpublishing.com

Please note that as of August 9th I shall no longer work for Blackwell Publishing. Please send all permission related requests to the address above.

Blackwell is committed to creating a culture of value and respect for all of our staff. We expect to work in an environment where there are high standards of behaviour and achievement. We maintain a culture which operates within accepted boundaries of professional behaviour and performance.

From: Pat Sweeney [mailto:pxs29@psu.edu]
Posted At: 03 August 2006 13:48
Posted To: 28 Jul -04 August
Conversation: Permission request
Subject: Permission request

I am a doctoral candidate at Penn State University and contacted your department in April 2006 to request permission for use of Dr. Pamela Mitchell's Quality Health Outcomes Model and the graphic depiction of the model from the article Quality health outcomes model in Journal of Nursing Scholarship (Vol. 30, No 1, 1998, p. 44). I am hoping to use the graphic depiction in my doctoral dissertation as this model is the theoretical framework for my study. I have not received any notification at this point and would like to check the status of this permission. Thank you for your assistance and time.

Patricia Sweeney
6 David Terrace
Scranton, PA 18505
Appendix M

Licensing Agreement QualityMetric

LICENSE AGREEMENT (OGSR)
Office of Grants and Scholarly Research

License Number: R1-041608-35574

Effective Date: August 7, 2008

Licensee Name: Patricia Sweeney
Licensee Address: 6 David Terrace

Royalty Fee: None, because this License is granted in support of the Permitted Use below

Administrative Fee: $250.00

Term: Beginning on August 12, 2008 and ending on August 12, 2009

Permitted Use: Non-commercial academic research - grant funded by government agency or non-profit organization – "The Effectiveness of Nurse Practitioners in Patients having Coronary Artery Bypass Grafting: A Descriptive Correlational Study."

Licensed Survey: As indicated in Appendix B attached

Manuals: Licensee must purchase (or have purchased) from QM a copy of the manuals indicated in Appendix B attached

Licensed Material: The Licensed Surveys and the Manuals.
VITA

Patricia Demko Sweeney PhD (c), MS, FNP, BC

Education

January 1999 - present  PhD candidate in Nursing
                         The Pennsylvania State University
                         University Park, PA

December 1986  Master of Science, Nursing: Family Nurse Practitioner
               State University of New York-Binghamton
               Binghamton, NY

May 1980  Bachelor of Science, Nursing
          Wilkes University
          Wilkes Barre, PA

Professional Experience: Academic

August 1992 - present  Instructor, AD and RN to BS programs
                       Penn State University
                       Worthington Scranton Campus

August 1995 - August 1992  Instructor, School of Nursing
                           Community Medical Center
                           Scranton, PA

Research and Awards

2009  Accepted Poster Presentation
      American Academy of Nurse Practitioners Annual Meeting
      Nashville, TN

2008  Dempster 2008 NP Doctoral Dissertation Research Grant
      The American Academy of Nurse Practitioners Foundation

2008  Contributing Author: McGonigle, D., & Mastrian, K. (Eds.)
      Nursing informatics and the foundation of knowledge.
      Boston, MA: Jones and Bartlett Publishers

2002  Havens, D. S., & Sweeney, P. Attracting & Keeping Nurses in
      Rural Hospitals: Magnet Features. 10th Annual Pennsylvania
      Rural Health Conference: New Directions for the Next Decade.
      Penn Stater Conference Center Hotel, State College, PA