

A MULTILEVEL MODEL OF RN WORKGROUP INTENT TO STAY

By

Peggy Ann Miller

B.A., University of Kansas, 1979
B.S.N., University of Kansas, 1983
M.S., University of Kansas, 1996

Submitted to the graduate degree program in Nursing and
the Graduate Faculty of the University of Kansas
in partial fulfillment of the requirements for the degree of
Doctor of Philosophy

Chairperson, Diane K. Boyle, RN, PhD

Marjorie J. Bott, RN, PhD

Nancy Dunton, PhD

Byron Gajewski, PhD

Michael Fox, ScD

Date Defended: October 26, 2007

© 2007
Peggy Ann Miller

The Dissertation Committee for Peggy Ann Miller certifies that this is the approved version of the following dissertation:

A MULTILEVEL MODEL OF RN WORKGROUP INTENT TO STAY

Chairperson, Diane K. Boyle, RN, PhD

Date Approved: November 15, 2007

ABSTRACT

An understanding of how determinants of RN intent to stay on the unit vary by unit type is essential for developing the targeted retention strategies that are an important component of efforts to address the evolving nursing shortage. Relationships depicted in the multilevel RN Workgroup Intent to Stay Model were examined, after determining the appropriateness of a workgroup level measurement model for intent to stay. The model was examined using secondary analysis of cross-section data from the National Database of Nursing Quality Indicators™ (NDNQI®). The sample consisted of 373 medical unit RN workgroups, which included 7,730 RNs in 157 hospitals. Data from the 2006 RN Survey were combined with hospital characteristics, unit staffing, and unit type. Psychometric analysis found the workgroup level measurement model of intent to stay appropriate. Glick's (1985) criterion for group-mean reliability was supported by ICC(2) values ranging from .521 to .598. Bliese's (2000) criteria for emergent construct validity were supported by an ICC(1) of .064 and zero-order correlations with job satisfaction subscales that were consistently higher at the workgroup level than individual level. Mixed linear modeling fit indices (BIC=2575.330) supported the fit of the revised RN Workgroup Intent to Stay Model in medical units, and pseudo R^2 indicated the model accounted for 56% of the variance in RN workgroup intent to stay. Higher ratings of RN workgroup satisfaction with task and appropriate RN assignments were the most important predictors of RN workgroup intent to stay. In addition, higher ratings of RN workgroup satisfaction with nurse management, lower percent of unit RNs taking

a meal break, and greater RN workgroup diversity in unit tenure and age also contributed to RN workgroup intent to stay. Findings indicated that retention strategies for RN workgroups on medical units should target perceptions of appropriate RN assignments, as well as satisfaction with task and nurse management. Refinement of the RN Workgroup Intent to Stay Model should continue by examining model relationships in other unit types.

ACKNOWLEDGEMENTS

This work is dedicated to the memory of my parents, Robert Otto and Lois June Miller. My father shared with me his passion for learning and his belief that I could “do whatever you set your mind to.” My step-mother, Ruth Maxine, was the example that set me on the road to higher education.

My husband, Stephen Max Scott, gave me the courage to begin this endeavor, the assurance that we were in it together, and the determination to see it through. For his unwavering support, I owe him more than I can ever return.

My advisor, Dr. Diane K. Boyle, generously and patiently shared her knowledge, and gave me confidence in my academic abilities. Whatever is good in this manuscript is the result of her guidance and expertise.

My dissertation committee members, Dr. Marjorie Bott, Dr. Nancy Dunton, Dr. Byron Gajewski, and Dr. Michael Fox offered insightful comments and helpful suggestions. Dr. Gajewski patiently guided the analysis, and offered thoughtful suggestions which greatly improved each chapter. Dr. Dunton provided expertise, as well as flexibility and understanding throughout this process.

Dr. Carol Decker, Dr. Carol Elliott, Dr. Caryl Goodyear-Bruch, and Dr. Susan Klaus generously shared experiences and insights from their dissertation journey. Donald Kelly provided invaluable technical assistance with manuscript preparation.

All the RNs who participate in the NDNQI RN Survey contributed to this research. Data were used with permission of the American Nurses Association’s National Database of Nursing Quality Indicators™ (NDNQI®).

TABLE OF CONTENTS

	page
Acceptance Page.....	ii
Abstract.....	iii
Acknowledgements.....	v
Table of Contents.....	vi
List of Figures.....	ix
List of Tables.....	ix
List of Appendices.....	x
CHAPTER I: INTRODUCTION.....	1
Problem Statement.....	1
Study Purpose.....	4
Study Objectives.....	4
Study Aims.....	4
Primary Aim.....	4
Secondary Aim.....	5
Background & Significance.....	5
Scope of Nursing Shortage.....	6
Causes of Nursing Shortage.....	7
Increased Demand.....	7
Decreased Supply.....	8
Work Environment Issues.....	9
Consequences of Nursing Shortage.....	13
Definition of Terms.....	15
Model Variables.....	15
Multilevel Modeling.....	16
Assumptions.....	17
Summary.....	18
CHAPTER II: INTEGRATIVE LITERATURE REVIEW.....	19
Overview.....	19
Review Purpose.....	21
Methodology.....	22
Search Methodology.....	22
Review Methodology.....	23
Findings.....	23
Literature Search.....	23
Conceptual Framework.....	24
Early Models.....	24
Price and Mueller Model and Extensions.....	26
Other Models.....	30
Setting and Sample.....	32
Measurement.....	35
Analytic Approach.....	39

TABLE OF CONTENTS continued

	Page
Results of Model Testing.....	40
Overall Model Success.....	41
Effects of Predictor Variables.....	42
Discussion.....	51
Conceptual Framework.....	53
Unit Type.....	54
Level of Model and Analysis.....	55
Setting and Sample.....	55
Measurement.....	56
Analysis.....	57
RN Workgroup Intent to Stay Model.....	58
Outcome Variable.....	59
Control Variables.....	60
Intervening Variables.....	61
Exogenous Variables.....	62
Multilevel Approach.....	63
Global Constructs.....	64
Emergent Constructs.....	64
Recap of Multilevel Approach.....	67
Summary.....	68
Chapter II Tables.....	69
CHAPTER III: METHODS.....	108
Research Design.....	108
Secondary Data Analysis.....	108
Multilevel Model.....	110
Setting and Sample.....	113
Multilevel Research Sampling.....	113
Hospitals.....	114
Units.....	115
RNs.....	116
Measures.....	116
Multilevel Research Measurement.....	116
RN Survey.....	117
Intent to Stay.....	118
Job Satisfaction Scales.....	118
Work Context and RN Demographics.....	124
Unit Staffing Data.....	125
Hospital Characteristics.....	127
Unit Types.....	127
Data Collection.....	128
NDNQI® Member Website.....	128
NDNQI RN Survey.....	129

TABLE OF CONTENTS continued

	page
Data Management.....	130
Data Aggregation.....	132
Analytic Plan.....	133
Secondary Aim.....	133
Primary Aim.....	134
Selection of Model Variables Tested.....	134
Linear Mixed Model.....	135
Ethical Considerations.....	138
Summary.....	139
Chapter III Tables.....	140
CHAPTER IV: RESULTS.....	158
Secondary Aim.....	158
Reliability.....	159
Validity.....	159
Primary Aim.....	160
Selection of Model Variables Tested.....	161
Results of Linear Mixed Model Analysis.....	165
Evaluation of Model Fit.....	165
RN Workgroup Satisfaction with Task.....	166
RN Workgroup Satisfaction with RN-RN Interaction	166
RN Workgroup Satisfaction with RN-MD	
Interaction.....	167
RN Workgroup Intent to Stay.....	167
Standardized Model Effects.....	168
Effects of Control Variables.....	170
Summary.....	171
Chapter IV Tables.....	172
CHAPTER V: DISCUSSION.....	177
Significance of Study.....	177
Literature Review Update.....	178
Interpretation of Results.....	179
Secondary Aim.....	179
Primary Aim.....	182
Determinants of RN Workgroup Satisfaction with	
Task.....	182
Determinants of RN Workgroup Intent to Stay.....	186
Effects of Control Variables.....	191
Determinants of RN Workgroup Satisfaction with	
RN-RN and RN-MD Interaction.....	192
Limitations.....	193
Implications.....	194
Recommendations.....	197

TABLE OF CONTENTS continued

Conclusion.....	page
199	
REFERENCES.....	200

LIST OF FIGURES

Figure 1	RN Workgroup Intent to Stay Model.....	2
Figure 2	General Structure of Nursing Turnover Models.....	25
Figure 3	Variables with Significant Path Coefficients in Nursing Turnover Models.....	36
Figure 4	Cross-Level Constructs of RN Workgroup Intent to Stay Model...	112
Figure 5	RN Workgroup Intent to Stay Model Tested.....	162
Figure 6	Direct Standardized Effects for Model Variables in Medical Units.....	169
Figure 7	Revised RN Workgroup Intent to Stay Model for Medical Units..	183

LIST OF TABLES

Table 1	Nursing Job Intention and Turnover Models Reviewed.....	69
Table 2	Samples in Literature Reviewed.....	71
Table 3	Sources of Job Satisfaction Items in Literature Reviewed.....	74
Table 4	Description of Job Intention Variables in Literature Reviewed.....	76
Table 5	Operational Definitions of Turnover Variable in Literature Reviewed.....	78
Table 6	Variance in Job Satisfaction, Commitment, Intention, and Turnover Explained by Models Reviewed.....	80
Table 7	Direct Effects of Environment and Organization Exogenous Variables on Stress, Satisfaction, Commitment, Intention, and Turnover in Literature Reviewed.....	82
Table 8	Direct Effects of Individual Exogenous Variables on Stress, Satisfaction, Commitment, Intention, and Turnover in Literature Reviewed.....	87
Table 9	Direct Effects of Exogenous Variables on Perceptions of Nursing work Environment in Literature Reviewed.....	91
Table 10	Direct Effects of Perceptions of Nursing Work Environment on Stress, Satisfaction, Commitment, Intention, and Turnover in Literature Reviewed.....	94
Table 11	Direct Effects of Intervening Variables on Satisfaction, Commitment, Intention, and Turnover in Literature Reviewed.....	101
Table 12	Type of Construct in RN Workgroup Intent to Stay Model.....	106
Table 13	Study Inclusion Criteria.....	140
Table 14	Number of Participants in 2006 NDNQI RN Survey and Study Sample.....	141
Table 15	Characteristics of Hospitals in 2006 NDNQI RN Survey and Study Sample.....	142

LIST OF TABLES continued

		page
Table 16	RN Survey Items Selected for the RN Workgroup Intent to Stay Model, Type of Multilevel Construct, and Representation in Model Testing.....	143
Table 17	Individual level NDNQI-Adapted RN Job Satisfaction Scales Cronbach's Alpha and Exploratory Factor Loadings.....	155
Table 18	RN Workgroup NDNQI-Adapted Job Satisfaction Scales Reliability Indices.....	156
Table 19	RN Workgroup NDNQI-Adapted Job Satisfaction Scales Validity Indices.....	157
Table 20	RN Workgroup Intent to Stay ICC(2) and ICC(1)	172
Table 21	Zero-order Correlations of Individual and RN Workgroup Intent to Stay with Individual and Workgroup Job Enjoyment and Job Satisfaction Subscale Scores.....	173
Table 22	Average or Variance Value of Conceptual Model Variables.....	174
Table 23	Results of Linear Mixed Model Analysis of RN Workgroup Intent to Stay Model.....	175
Table 24	Standardized Direct Effects on Satisfaction with Task, and Direct, Indirect, and Total Effects on Intent to Stay.....	176

LIST OF APPENDICES

A	Abstraction Form.....	222
B	2006 NDNQI RN Survey with Job Satisfaction Scales.....	224
C	RN Survey Coordinator 2006 Web Data Collection Protocol.....	232
D	Letter of Invitation to participate in Survey from NDNQI to RNs	244
E	KU School of Nursing Student Research Scientist Agreement.....	246
F	Certificate of Human Subjects Protection Training Completion...	249

CHAPTER I

INTRODUCTION

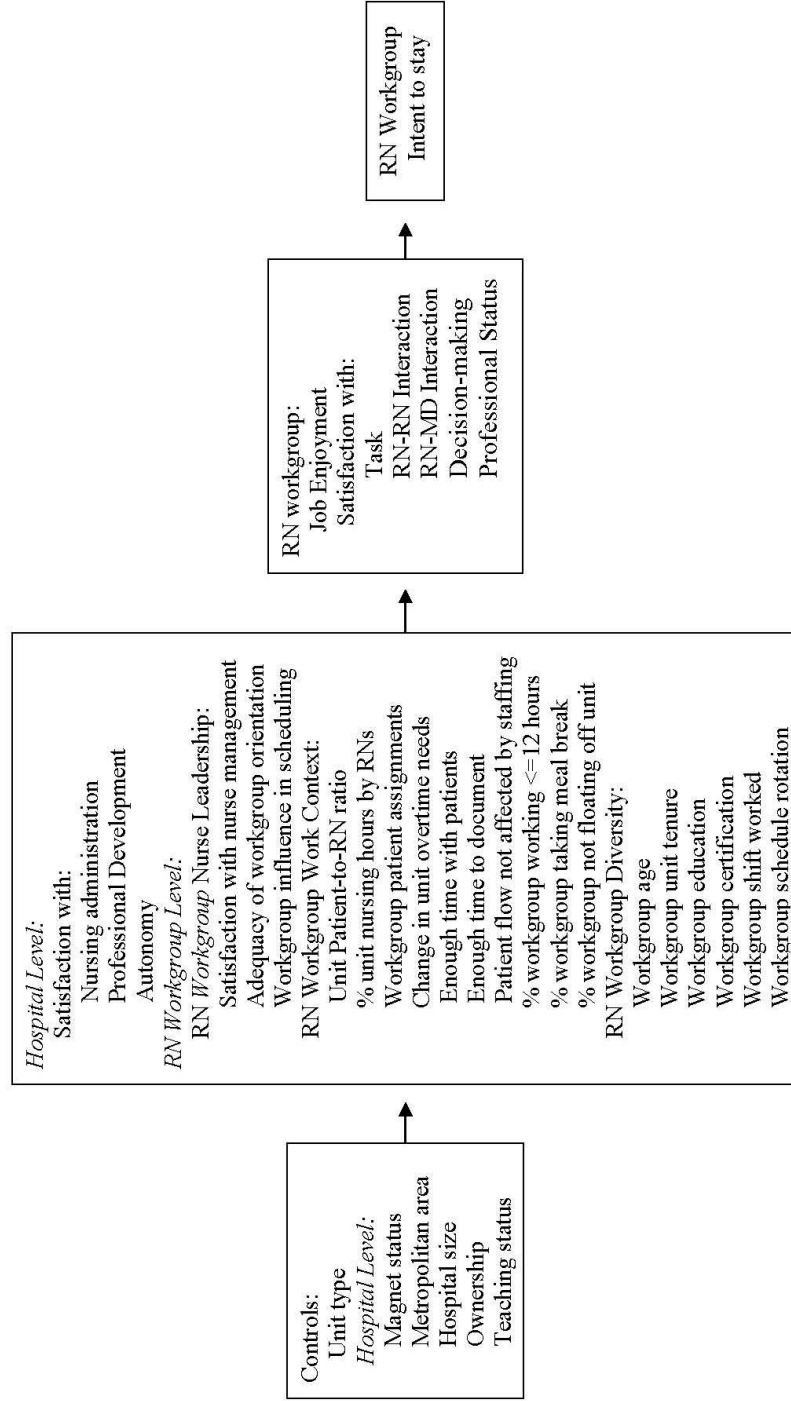
I analyzed an existing database to refine a comprehensive multilevel model of intent to stay on the job among registered nurses (RNs) who are direct care providers in acute care hospitals. The study contributes to the understanding of how determinants of RN intent to stay vary by unit type, which is needed to support the development of research-based, targeted retention efforts. Retention efforts are one of the essential factors needed to address the evolving nursing shortage that, if unchecked, has the potential to “cripple the health care system” (Buerhaus, Needleman, Mattke, & Stewart, 2002, p. 125).

Chapter I specifies study objectives and aims, describes the study background in terms of the nursing shortage, and lists definitions of important terms. Chapter II provides results of a review of literature reporting models of nursing job intention and turnover, and introduces the model based on this literature, RN Workgroup Intent to Stay Model (Figure 1, p. 2). Chapter III describes the study methodology, and Chapter IV presents the results of model testing. Chapter V discusses the findings, and presents recommendations for future research.

Problem Statement

“The magnitude of the projected RN shortage not only will decrease access to care but could cripple the health care system,” in the view of leading nursing workforce researchers (Buerhaus et al., 2002, p. 125). The shortage is attributed to an increasing demand for nurses by a population that is aging rapidly, a decreasing

Figure 1
RN Workgroup Intent to Stay Model



supply of nurses, and a dissatisfying work environment (Bleich & Hewlett, 2004). The nursing workforce itself is not only aging rapidly, but is increasingly dissatisfied, while declining numbers are entering the profession, and new entrants are rapidly leaving (Aiken et al., 2001; Buerhaus, Staiger, & Auerbach, 2000a; Lake & Friese, 2006; Sochalski, 2002). To address the impending nursing workforce crisis, an unparalleled focus on nurse retention efforts is needed, in addition to the traditional concentration on recruitment.

Job satisfaction is the best predictor of intent to stay or leave the job, and, in turn, job intention is the best predictor of retention, resignation, or turnover (e.g., Bott, Boyle, Woods, & Taunton, 1993; Boyle, Bott, Hansen, Woods, & Taunton, 1999; Hinshaw, Smeltzer, & Atwood, 1987; Lake, 1998; Price & Mueller, 1981; Taunton, Boyle, Woods, Hansen, & Bott, 1997; Weisman, Alexander, & Chase, 1981a). This causal order is well supported, although a large amount of variance in both job satisfaction and intent to stay remains unexplained. In addition, how job satisfaction and intent to stay varies across different types of nursing units within hospitals, as well as by hospital Magnet status is particularly unclear. Magnet designation is awarded to hospitals with exemplary nursing practice environments by the American Nurses Credentialing Corporation (ANCC, 2006, Urden & Monarch, 2002), and has been linked to better nursing and patient outcomes in a growing body of research (Scott, Sochalski, & Aiken, 1999).

Identifying factors that affect job satisfaction and intent to stay may provide the foundation needed to develop effective retention interventions. Retention

interventions are likely to be most effective in increasing RN job satisfaction and intent to stay if they can be targeted to RN workgroups on specific types of nursing units. This research begins to refine a comprehensive predictive model of RN workgroup intent to stay. The model incorporates a group-level assessment of a broad range of predictors.

Study Purpose

The purpose of this research is to extend work of previous researchers in advancing a model of workgroup intent to stay for RN direct care providers in acute care hospitals. The unique aspects of the study entail developing a multilevel model, including Magnet hospital designation in the model, and exploring intent to stay as a workgroup level construct. The study is the first to examine the validity of intent to stay as a workgroup level phenomenon.

Study Objective

The objective of this study is to examine relationships depicted in the RN Workgroup Intent to Stay Model (Figure 1, p. 2) within one type of unit. I selected medical units because they are the most common distinct unit type within acute care hospitals, yet seem most likely to exemplify a typical or representative unit.

Study Aims

Primary Aim

Examine relationships depicted in the RN Workgroup Intent to Stay Model (Figure 1, p. 2) within medical units.

Secondary Aim

Examine the appropriateness of a workgroup level measurement model for intent to stay.

1. Examine reliability using the intraclass correlation coefficient ICC(2).
2. Examine construct validity using two methods.
 - i. Examine the intraclass correlation coefficient ICC(1).
 - ii. Compare correlations between job satisfaction subscales and intent to stay at the individual and workgroup levels.

Background & Significance

In the late 1990's, amid concerns of an over-supply of RNs following hospital restructuring efforts (Buerhaus & Staiger, 1999; Pew Health Professions Commission, 1995), few recognized the first signs of the nursing shortage that were beginning to appear in critical care units and operating rooms (Buerhaus, Staiger, & Auerbach, 2000b). The evolving nursing shortage is now clearly recognized as something entirely different (Agency for Healthcare Research and Quality, 2004; Berliner & Ginzberg, 2002) than the cycles of shortage and excess that characterized the American nursing profession throughout the 20th century (Friss, 1994).

Beginning in 2000, a large number of reports describing the nursing shortage and work environment have been issued by professional nursing organizations (American Association of Colleges of Nursing, 2001; American Association of Critical Care Nurses, 2005; American Nurses Association [ANA], 2002; Federation of Nurses and Health Professionals, 2001), the healthcare industry (American

Hospital Association [AHA], 2001; American Organization of Nurse Executives [AONE], 2000; Joint Commission of the American Hospital Organizations [JCAHO], 2004; Veterans' Health Administration, 2001; VHA Research Series , 2002), and policy and research institutes (Institute of Medicine, 2004; Robert Wood Johnson Foundation, 2002). Reports of numerous national nursing surveys describing nursing workforce issues have been published (ANA, 2001a, 2001b; AONE, 2002; Spratley, Johnson, Sochalski, Fritz, & Spencer, 2000; Health Resources and Service Administration [HRSA], 2004). Scholars have issued reviews of national work force reports (Bleich et al., 2003) as well as academic papers (Goodin, 2003). As Bleich and Hewlett (2004) found, the primary sources of data regarding the nursing shortage continue to be federal agencies (AHRQ, 2004; General Accounting Office [GAO], 2001a, 2001b; HRSA, 2002), the work of Peter Buerhaus and colleagues, and Linda Aiken and colleagues.

Scope of Nursing Shortage

Based on the quadrennial National Sample Survey of Registered Nurses (NSSRN) (HRSA, 2004), the number of RNs employed in nursing in 2004 was estimated as 2,421,461, or 83% of all RNs employed in any setting. Of those employed in nursing, 56% or 1,300,323 were employed in hospital settings. Of those employed in hospital settings, 31% were employed in general or specialty medical or surgical units, 17% in critical care, 12% in operating rooms or post-anesthesia care units, while emergency rooms, labor and delivery, outpatient areas, step-down units,

pediatrics, and psychiatric units employed between 8% and 4% each (Spratley et al., 2000).

Based on the 2000 NSSRN, HRSA projected that the 6% national shortage of RNs of 2000 would grow slowly to 12% by 2010, then rapidly to 29% by 2020. The AONE (2002) reported national average hospital vacancy rates of 10% in 2000, with highest rates in critical care (15%), medical/surgical units (14%), and emergency rooms (12%). A federal government report (GAO, 2001a) listed turnover rates for hospital staff nurses of 15% in 1999 and for all hospital nursing department staff of 26% in 2000. In more recent national surveys, 82% of RNs, 81% of MDs (Buerhaus, Staiger, & Auerbach, 2004), and 85% of hospital executives (American College of Healthcare Executives, 2005) reported shortages of RNs in the hospitals they worked.

Causes of Nursing Shortage

Increased Demand

Bleich and Hewlett (2004), label the nursing shortage a “perfect storm” caused by the combination of an increased demand for nurses, a decreased supply of nurses, and troubled work environment. Increased demand for nurses is largely driven by demographics. Between 2000 and 2030, the U.S. population will grow 18%, and the number of people over 65 years will double (GAO, 2001b). Most telling is the change in the ratio of women between 25 and 54 years old (i.e., the core of the nursing workforce) to people 85 years and older (i.e., the core of the recipients of care), which will decline dramatically from 16:1 in 2000, to 8:5 in 2030, to 5:7 in 2040 (GAO).

Decreased Supply

The decreased supply of nurses is attributable to fewer nurses entering the profession, an aging nursing workforce, and dissatisfaction with the nursing work environment (GAO, 2001a). The decline in the number of young women choosing nursing as a career during the last two decades of the 20th century lead to a steady aging of the RN workforce. Buerhaus and colleagues (Buerhaus, Staiger, & Auerbach, 2000a; Buerhaus, Staiger, & Auerbach, 2003; Buerhaus et al., 2004) characterize this aging as a fundamental, permanent, structural shift in the RN workforce. The most prominent factor in the declining interest in nursing appears to be the expansion of opportunities for women in formerly male dominated professions (Staiger, Auerbach & Buerhaus, 2000). Accordingly, the growth in the RN workforce has slowed from 14.2% between 1992 and 1996 to 7.9% between 2000 and 2004. The average age of nurses in 2004 was 46.8, and only 8% were under 30 years old (HRSA, 2004).

The effects of these demographic shifts vary in different types of hospital units. Shortages occurred early in critical care units, which attract young nurses, as the number of young women entering nursing declined. In operating rooms, early shortages were due to the retirement of diploma nurses, who had been drawn to the operating room during clinical experiences prior to the mid 1970's (Buerhaus, Staiger, & Auerbach, 2000b).

The two primary strategies traditionally used to increase the supply of new nurses are to increase enrollments in nursing programs and to recruit foreign nurses.

Buerhaus, Staiger, and Auerbach (2003) estimate that enrollments would have to increase at least 40% annually to replace RNs expected to retire. Yet, nursing schools turned away over 40,000 qualified applicants in 2005 due to a shortage in faculty, clinical sites, and budget constraints (American Association of Colleges of Nursing, 2006). Regarding recruiting foreign nurses, Buerhaus, Staiger, and Auerbach (2000a) feel that an unprecedented scale of immigration would be required to eliminate the projected shortage. Even at current levels, a growing international debate of ethical, quality, and global workforce issues surrounds recruitment of foreign nurses (Brush, Sochalski, & Berger, 2004).

Work Environment Issues

The troubled nursing work environment has been the central theme in reports of a number of recent national RN surveys. In fact, the leading recommendation from RNs surveyed by Buerhaus, Donelan, Ulrich, Norman, and Dittis (2006) on how to solve the nursing shortage was to improve the work environment. Work environment issues have been attributed in part to the restructuring efforts of the 1990's, which fundamentally affected nursing roles, skill mix, workload, and authority (Aiken, Clark, & Sloane, 2001; JCAHO, 2004; Norrish & Rundall, 2001). Work environment changes that would cause over 40% of RNs planning to leave their present position to reconsider included better staffing, higher salary or benefits, more respect from administration, and more opportunities for professional development (Buerhaus, Donelan, Ulrich, Norman, & Dittus, 2005). Work environment concerns highlighted in survey reports involve salary and benefits, nursing management and

administration, schedules and work hours, health and safety, as well as workload and staffing.

Aiken, Clarke, Sloane, Sochalski et al. (2001) reported only 29% of RNs felt that administration listens and responds to their concerns, and only 41% felt they had an opportunity to participate in policy decisions. Buerhaus et al. (2006) reported that RNs listed undesirable hours as one of the top four reasons for the nursing shortage, whereas 40% of nurses in the NSSRN (Spratley, 2000) who left nursing cited undesirable hours as the reason for leaving. Fifty-six percent of nurses in the Federation of Nurses and Health Professionals survey (Federation of Nurses and Health Professionals, 2001) considered leaving nursing for less physically demanding work, whereas 40% responding to the Health and Safety survey (ANA, 2001b) reported being injured on the job, and 20% of nurses in the NSSRN (Spratley et al., 2000) who left nursing cited safety as the reason for leaving.

Changes in health care since the 1980's that have resulted in greater nursing workloads include increased technology, decreased length of stay, and increased acuity (AHRQ, 2004). JCAHO (2004) cited "scope creep," as another contributor to increasing nursing workloads. Scope creep refers to shifting ancillary staff job duties to nursing staff as shortages in ancillary staff occur, such as delivering meals or filling supply cabinets. Aiken, Clarke, Sloane, Sochalski et al. (2001) reported that only 33% of RNs had enough staff to get their work done, while 83% felt an increase in the number of patients assigned to them over the past year.

Job dissatisfaction. The work environment affects RN job satisfaction and intent to stay on the job. Aiken, Clarke, Sloane, Sochalski et al. (2001) reported that over 40% of RNs surveyed were dissatisfied. In addition, dissatisfaction among nurses is higher than other workers, as only 10% of professional workers and 15% of workers in general reported dissatisfaction. However, others have found higher levels of nursing job satisfaction. Sochalski (2002) found 69.5% of the nurses participating in the NSSRN reported being at least moderately satisfied with their jobs. Buerhaus et al. (2006) reported that 83% of nurses surveyed were at least somewhat satisfied with their job, and that job satisfaction among nurses is higher than lawyers and health executives.

Aiken, Clarke, Sloane, Sochalski, and Silber (2002) found dissatisfaction and burnout strongly associated with nursing workloads, measured as patient-to-nurse ratios. Aiken and colleagues found that an increase of one patient per nurse in a hospital's staffing level increased nurses' dissatisfaction by 15% and increased nurses' burnout by 23%. These researchers concluded that improving nurse staffing levels may reduce hospital turnover rates by reducing burnout and job satisfaction, the major precursors of resignation.

Using data from the 2004 National Database of Nursing Quality Indicators™ (NDNQI®) RN Survey, Boyle, Miller, Gajewski, Hart, and Dunton (2006) found significant differences in RN workgroup job satisfaction among ten unit types. Across all domains of job satisfaction, RN workgroups in pediatric units were most satisfied, whereas RN workgroups in surgical services and emergency departments were least

satisfied. RN workgroups across all unit types were most satisfied with nurse-to-nurse interaction, professional status, and professional development, and were much less satisfied with task, decision making, and pay (Boyle et al.).

Intent to stay on the job. Aiken, Clarke, Sloane, Sochalski et al. (2001) found that 23% of all hospital nurses and 33% of hospital nurses less than 30 years old intend to leave their position within the next year. Aiken et al. (2002) found that 43% of nurses who report dissatisfaction and burnout intend to leave within the next year, although only 11% who are satisfied with their job and do not report burnout intend to leave. Buerhaus, Donelan, Ulrich, Kirby et al. (2005) found that 93% of RNs believe the shortage will cause nurses to leave their position, although 60% reported no plans to leave.

According to estimates based on the 2000 NSSRN, 18% of all RNs, or 494,727 nurses, are not employed as nurses (Spratley, 2000). Of these, 27% or 135,592 are employed. Most of these left nursing recently, 16% within the past year, 44% left within the past five years. Of the nurses who are less than 44 years old and have left nursing, 40,000 are employed, and 80,000 are not.

One of the more alarming trends Sochalski (2002) found in her analysis of the NSSRN data was the decrease in the number of years nurses work before leaving nursing, particularly male nurses. In 1992, 2.7% of women and 2.0% of men left nursing within four years of entry. By 2000, 4.1% of women and 7.5% of men had left within four years. This exodus speaks to the need for initiatives designed to retain nurses and recover those who leave. According to Sochalski, retention

initiatives should occupy an equal place alongside conventional supply-building recruitment activities.

Buerhaus et al. (2006) found that nurses did not see efforts to increase retention in their work settings. These researchers found that the majority of nurses observed only one retention initiative, which was mentoring programs for new graduate nurses in their first position. These researchers concluded that a critical need exists for retention initiatives to help retain nurses now entering the profession, as well as those near retirement. Assuming that the culture of each hospital organization is unique, Buerhaus and colleagues advised hospital nursing administrators to assess their workplaces, unit by unit, to guide work environment improvements, rather than rely on findings of national surveys.

Consequences of Nursing Shortage

Although the nursing shortage is expected to increase rapidly over the next two decades, patients, nurses, and hospital administrators are currently experiencing its consequences in terms of decreased access to care and quality of care, as well as increased healthcare costs. Nurses have reported negative effects of the shortage on patient care in survey after survey (Aiken et al., 2002; Buerhaus, Norman, et al., 2005). For example, 45% of RNs surveyed report that the quality of care in their hospital has deteriorated in the last year (Aiken, Clarke, Sloane, Sochalski et al., 2001). Hospital administrators also have reported negative effects of the workforce shortage on patient care services provided. For instance, 38% of hospital administrators report emergency department overcrowding, 25% report diverted

emergency patients, and 23% report a reduction in the number of staffed beds (AHA, 2001).

Needleman, Buerhaus, Mattke, Stewart, and Zelevinsky (2001, 2002) investigated the relationship between nurse staffing levels and patient care in acute care hospitals in a national sample of hospitals. Needleman et al. (2001) found strong and consistent relationships between nurse staffing levels and adverse patient outcomes, e.g., urinary track infection, pneumonia, length of stay, upper gastrointestinal bleeding, and shock in medical patients, and failure to rescue in surgical patients. Needleman, Buerhaus, Stewart, Zelevinsky & Mattke (2006) modeled costs of increasing nurse staffing with costs of adverse patient outcomes and hospital days that would be avoided with increased nurse staffing. These researchers found either a net reduction in costs or a small net increase in costs across models.

Perhaps the most recognized reflection of the financial consequences of the nursing shortage is the cost of nursing turnover. Even the costs of nursing turnover, however, are difficult to estimate because they are largely hidden. To address the need for reliable estimates, Jones (2004, 2005) developed the Nursing Turnover Cost Calculation Method. In addition to obvious costs of advertising, recruiting, hiring, and orientation, hidden costs also were included. Costs resulting from staff shortages due to turnover include costs of replacement staffing at overtime or agency pay rates, as well as losses due to closed beds and patient deferrals. Also included are costs of decreased productivity of both new RNs and RNs in the period immediate before turnover. Jones (2005) estimated the cost per RN turnover ranged from \$62,100 to

\$67,100, or from 1.2 to 1.3 times the average RN salary, depending on whether the RN was a new or an experienced RN. For a hospital with 500 RNs and a 20% annual turnover rate, annual turnover costs are in excess of \$6 million, using this methodology.

In summary, the evolving shortage of nurses is attributed to an increased demand for nurses, a decreased supply of nurses, and a negative nursing work environment. Job dissatisfaction, decreased intent to stay on the job, and increased turnover are linked to the adverse working conditions found on nursing units. Consequences of the nursing shortage include decreased quality of care, decreased access to care, and increased cost of care. Averting the impending nursing shortage crisis will require an unprecedented focus on retention along side a renewed focus on recruitment. The current study began the refinement of a comprehensive model of RN workgroup intent to stay. Unique aspects of the study included developing a multilevel model, and exploring intent to stay as a workgroup level construct. Terms used in the study are defined below, followed by a listing of study assumptions and limitations.

Definition of Terms

Model Variables

Intent to Stay on the Unit: perceived likelihood of staying on the unit in the next year

Job Satisfaction: reflects the degree to which individuals like their work.

NDNQI-Adapted Index of Work Satisfaction Scales:

Autonomy: satisfaction with the degree of independence on the nursing unit in performance and critical thinking.

Decision-making: satisfaction with performance boundaries on the nursing unit.

Nurse-Nurse Interactions: satisfaction with interpersonal peer relationships and interactions on the nursing unit

Nurse-Physician Interactions: satisfaction with interpersonal collegial relationships and interactions on the nursing unit

Professional Status: satisfaction with respect and self-esteem on the nursing unit

Task: satisfaction with the actual requirements regarding work performance on the nursing unit

NDNQI-Adapted Nursing Work Index-Revised Scales:

Nursing Administration: perceived encouragement and professional support received from the chief nursing officer.

Nursing Management: perceived encouragement and professional support received from the nursing unit manager.

Professional Development: perceived opportunities to enhance professional skills.

Multilevel Modeling

Bottom-up Process: describes the process in which lower-level properties emerge to form collective phenomena.

Emergence Model: measurement model in which data from a lower level are combined in a collective or aggregate form to create a higher-level construct.

Isomorphism: indicates a construct's content is essentially the same across all levels of analysis.

Non-independence: refers to the degree that individual responses are influenced by group membership. It is estimated by applying the intraclass correlation coefficient ICC (1) calculation to the dependent variables of the study

Referent-shift Consensus Model: a composition measurement model in which a higher-level construct is derived from the original individual level construct by shifting the referent to the higher level prior to assessment.

Top-down Process: describes the influence of higher-level contextual factors on lower-level phenomena.

Assumptions

The following assumptions were used as a foundation for this study:

1. Model variables have individual and group-level reliability and validity.
2. All major variables affecting job satisfaction and intent to stay are included in the conceptual model.
3. The causal order of model variables is correctly specified.
4. Lower-level entities are nested within identifiable higher-level entities.

5. Lower-level entities are exposed to and influenced by characteristics and/or processes of the higher-level entities.
6. The outcome variable is measured at the lowest level of interest.
7. Predictor variables are not redundant.
8. Variables are approximately normally distributed.
9. Relationships among variables are approximately linear.
10. Variability in scores for one variable is approximately the same at all values of another variable (homoscedasticity).

Summary

Addressing the looming nursing shortage crisis will require unparalleled efforts to retain existing nurses, in addition to recruiting additional numbers. A better understanding of the determinants of job satisfaction and intent to stay in specific types of nursing units is needed to develop targeted, effective interventions to attract and retain nurses. This study extends the work of previous researchers by refining a comprehensive model titled the RN Workgroup Intent to Stay Model. The model is unique as a multilevel model that explores intent to stay as a workgroup level construct, and includes Magnet hospital designation and measures of RN workgroup diversity as predictors. Advancing this model required an initial examination of the validity of intent to stay as a workgroup level construct. In Chapter II I review previous reports of nursing job intention and turnover multistage models, and introduce the RN Workgroup Intent to Stay Model (Figure 1, p. 2) based on this body of research.

CHAPTER II

INTEGRATIVE LITERATURE REVIEW

Chapter II contains an integrative review of reports of multistage models of nursing job intention and turnover. I chose an integrative review as the format for the chapter because it offered a targeted approach to the development of my conceptual model. Integrative reviews are “primarily interested in inferring generalizations about substantive issues from a set of studies directly bearing on these issues” (Jackson, 1980, p. 438). This body of research centers on Price and Mueller’s model (Cavanagh & Coffin, 1992; Curry, Wakefield, Price, Mueller, & McCloskey, 1985; Gurney, Mueller, & Price 1997; Mueller, & Price, 1990; Price & Mueller, 1981; Price & Mueller, 1986) and extensions (Bott et al., 1993; Boyle et al., 1999; Hinshaw et al., 1987; Leveck & Jones, 1996; Lucas, Atwood, & Hagaman, 1993; Taunton et al., 1997). The most successful models can explain about 50% of the variance in nursing job intention and 20% of the variance in nursing turnover. After I discuss conceptual framework, level of analysis, sampling, measurement, and analytic issues identified in this body of research, I conclude Chapter II with a description of the model based on this literature, the RN Workgroup Intent to Stay Model (Figure 1, p. 2).

Overview

Researchers have been examining employee turnover for nearly a century (Muchinsky & Morrow, 1980). According to Mueller and Price (1990), economists were the first to be interested in turnover, followed by organizational and industrial psychologists, and then sociologists. Economists found turnover associated with

greater job markets, lower pay, and general job training (Mueller & Price).

Psychologists, interested in employee attitudes and decision-making, found turnover associated with lower job satisfaction, organizational commitment, and intention to stay (Mueller & Price). Organizational sociologists found turnover associated with aspects of the work setting and the nature of the work itself, such as the distribution of power, cohesiveness of workgroups, and how routine the job tasks were (Mueller & Price). More recently, organizational scientists (Ostroff, 1992) have been using a multilevel approach, which incorporates the complex, nested nature of the turnover phenomenon.

Prior to the 1970's, researchers were concerned primarily with bivariate relationships of a predictor with job turnover (Maertz & Campion, 1998). Based on their authoritative review of turnover literature, Porter & Steers (1973) concluded that the major predictor of turnover was job satisfaction, and, in addition, identified four specific groups of factors related to turnover: organization-wide factors; immediate work environment factors; personal factors; and job-related factors. Most of the early, bivariate turnover research focused on blue-collar workers, where turnover was high (Price & Mueller, 1981). Beginning in the 1970's, researchers used this body of evidence to develop complex, multivariate, multistage models of turnover (Maertz & Campion). The three classic models were constructed by (1) Price (1977), emphasizing the predictor of job satisfaction; (2) Porter, Steers, Mowday, and Boulian (1974), emphasizing organizational commitment; and (3) Mobley, Horner,

and Hollingsworth (1978), emphasizing the job intention decision-making process (Bluedorn, 1982).

Diamond & Fox (1958), in an early review of nursing turnover studies, concluded that the major predictor of nursing turnover was job satisfaction. Subsequent reviews of nursing turnover studies consistently identified job satisfaction and job intention as the major predictors of nursing turnover (Borda & Norman, 1997; Cavanagh, 1989; Hinshaw & Atwood, 1983; Irvine & Evans, 1995; Tai, Bame, & Robinson, 1998). In early nursing turnover bivariate studies, researchers began to identify variables more specific to nursing. For instance, Kramer (1968) found nursing role conflict related to job satisfaction and turnover, and McCloskey (1974) examined the outcome of nursing retention, rather than turnover. When researchers began to test multistage models of turnover, nursing models (Price & Mueller, 1981; Sheridan & Vredenburg, 1979) were among the earliest models tested because nurses provided an opportunity to examine turnover in a professional group with high turnover rates (Price, 1977).

Review Purpose

The purpose of this integrative review was to identify and critique studies using multistage models to predict either nurse turnover or intention. I used the results of this review to refine a model for testing. In this review, I used the term turnover to refer to both voluntary job turnover and job retention. Turnover is the voluntary separation of an individual from an organization (Price & Mueller, 1981), and job retention refers to the preservation of staff (Leveck & Jones, 1996). I used

the term job intention to refer to intention to stay on the job, to leave the job, or anticipated turnover. Intent to stay is the likelihood perceived by the individual of continued participation in the organization (Price & Mueller), intention to leave the job is the employee's intention to leave the organization (Curry et al., 1985), and anticipated turnover is the degree to which staff perceive they will terminate their position eventually at some unspecified time in the future (Hinshaw, Smeltzer, & Atwood, 1987). Job satisfaction is the degree to which individuals like their job (Price & Mueller).

Methodology

Search Methodology

The inclusion criteria for this review included reports of research using: (a) a multistage model conceptual framework and methodology, (b) an outcome variable of intent to leave or stay on the job, job turnover, or retention, and (c) a sample limited to nurses in the United States. I searched the computerized bibliographic databases CINHALL, MEDLINE, PSYCHLIT, and PUBMED using the search terms nurses, registered nurses, and nursing staff combined with personnel or employee turnover, personnel retention, and job satisfaction. I did not limit the year of publication in my search, but included all years of each database, which included 1982 for CINHALL, 1966 for MEDLINE, 1972 for PSYCHLIT, and 1950 for PUBMED. My database search ended with October, 2005. I screened reference lists in relevant literature and asked content experts to identify important research reports. I included unpublished reports from nationally funded, peer-reviewed research, and excluded unpublished

dissertations. I reviewed the titles and abstracts of all identified reports, then performed a more detailed review of study methodologies, excluding articles that did not meet the inclusion criteria.

Review Methodology

I reviewed the final set of articles in detail, using an abstraction form I developed for this process (see Appendix A). The abstraction form incorporated an assessment of the methodological quality of each study, using criteria derived from Petersen and White (1989). External validity criteria included description of subject selection, non-participants, subjects, variables, data collection methods, and reactivity of study. Internal validity criteria included sufficient coverage by sample frame, sample size adequate for analysis, valid and reliable measures, appropriate statistical methods, accuracy of results, and no important extraneous variability.

Findings

Literature Search

From the more than 500 articles identified in the initial database search, 22 articles representing 18 studies remained after applying the inclusion criteria. Then, recognizing Price and Mueller's (1981) model as the landmark model of this body of literature, I divided the literature into three categories: (a) early models, (b) Price and Mueller model and extensions, and (c) other models (see Table 1, p. 69). The early models were published before Price and Mueller's work. The Anticipated Turnover Model (Hinshaw, Smeltzer, & Atwood, 1987) and the Organizational Dynamics

Paradigm Model (Taunton et al., 1997) were explicit extensions of Price and Mueller's model. The final category includes all other models.

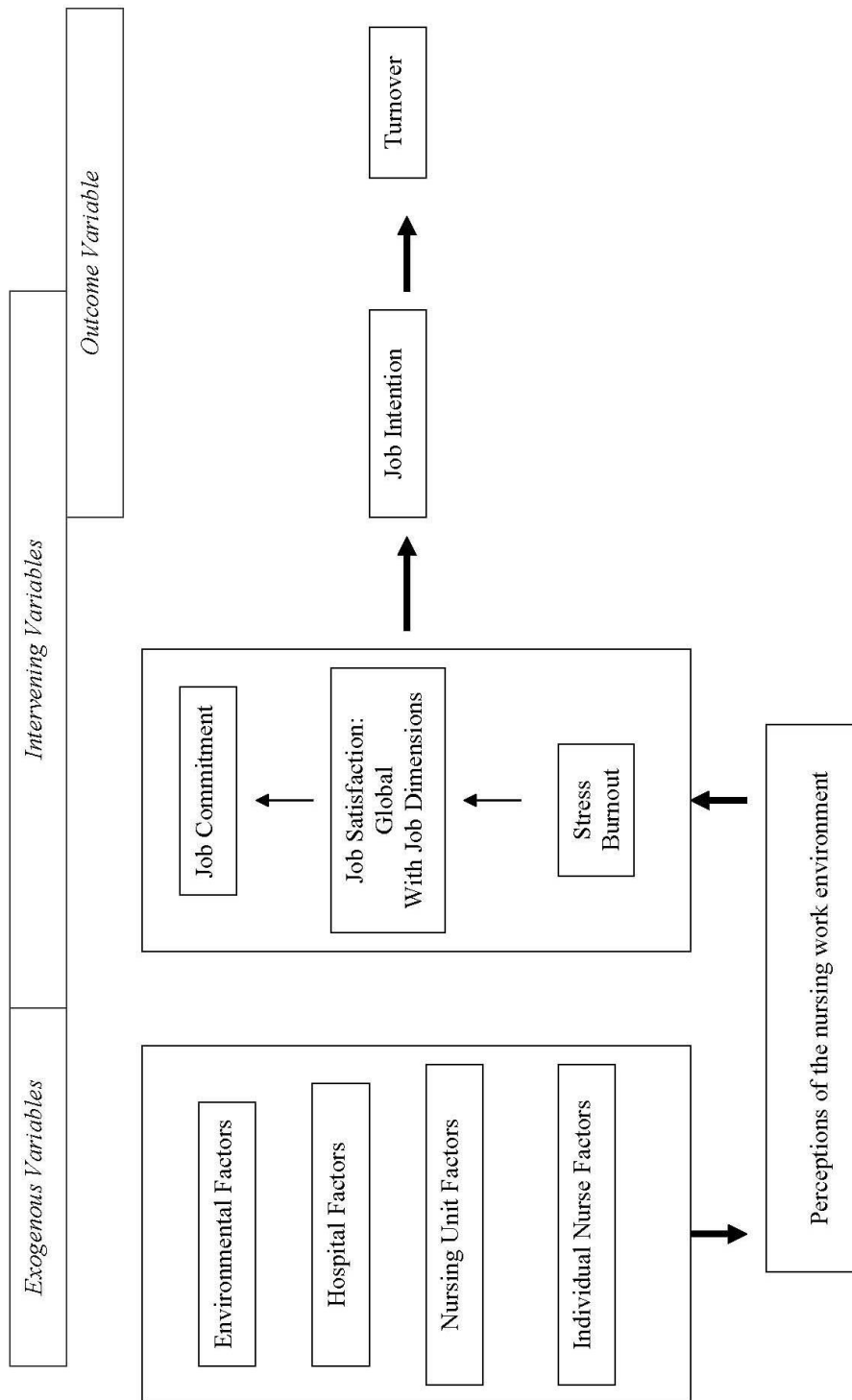
Conceptual Framework

Nursing turnover models included in this review share the general structure illustrated in Figure 2 (p. 25). I divided the wide variety of exogenous variables into the categories of environmental, hospital, nursing unit, and individual nurse factors, as well as nurse perceptions of the work environment. Nurse perceptions are specified as both exogenous and intervening variables across the models. Investigators identify a number of different hospital, nursing unit, and individual nurse factors as control variables, rather than included model variables. In contrast to the variety found across exogenous variables, nursing turnover models are more consistent in the identification and causal ordering of the endogenous variables. The intervening variables examine nurses' affective responses and attitudes toward their job (e.g., stress, job satisfaction, commitment, and job intention). Investigators identify either job intention or turnover behavior as the model outcome variable. I describe the model variables in more detail below.

Early Models

Only two multistage models of nursing turnover were tested prior to Price and Mueller's work, the first by Sheridan and Vredenburg (1979). Exogenous variables included the nursing unit factor of nurse workgroup size and individual nurse factors of locus of control, job tenure, and nurse perception of the work routine. In this model, the endogenous variables, in causal order, included unit manager leadership;

Figure 2
General Structure of Multi-stage Nursing Turnover Models



group relations and nurse job tension; and turnover. The model was unique in conceptualizing nurse manager leadership as an endogenous variable, and in not including job satisfaction or job intention.

As the second multistage model of nursing turnover tested, Weissman, Alexander, and Chase's model (1981a, 1981b) included a remarkably comprehensive set of exogenous variables. Nursing unit factors included nurse workload and nurse manager leadership. Individual nurse factors included personal variables of marital status, number of children, and locus of control, and work related variables of position level, education, overtime, and shift rotation. Nurse perceptions of the work environment included task delegation and professional time adequacy. Perceptions of autonomy were conceptualized as the initial endogenous variable. The final stages of Weissman et al.'s model, and all subsequent turnover models with little exception, followed the general causal order of job satisfaction, job intention, and turnover.

Price and Mueller Model and Extensions

Price, Mueller, and colleagues (i.e., Curry et al., 1985; Gurney et al., 1997; Mueller & Price, 1990; Price & Mueller, 1981; Price & Mueller, 1986) developed and refined a comprehensive model synthesizing economic, psychology, and sociology traditions. The Price and Mueller model generated a significant body of research, including replication studies (Cavanagh & Coffin, 1992), and studies testing two major model extensions, the Anticipated Turnover Model (Hinshaw et al., 1987; Leveck & Jones, 1996; Lucas et al., 1993) and the Organizational Dynamics Paradigm Model (Bott et al., 1993; Boyle et al., 1999; Taunton et al., 1997).

The four stages of the first Price and Mueller (1981) model included exogenous variables, job satisfaction, job intention, and turnover. Exogenous variables included the environmental factor of employment opportunity, the hospital factor of pay, and individual factors of kinship responsibility, training, and professionalism. Price and Mueller treated the individual factors of age, tenure, and part-time or full-time status as correlates, rather than exogenous variables, arguing that these variables did not add explanatory (i.e., theoretical) power to the model. The major advancement of Price and Mueller's model was their addition of a comprehensive group of nurse perceptions of the work environment, which included routinization, instrumental communication, integration, distributive justice, promotional opportunity, and participation. In their model, these nurse perceptions were considered exogenous variables.

Curry et al. (1985) added job commitment as a model stage causally ordered between the intervening variables of job satisfaction and job intention, which was a major model modification followed by several subsequent models. In addition, Curry et al. also added the nursing unit factors of role overload and nursing workgroup size to the model exogenous variables.

In an effort to incorporate what they recognized as a paradigm shift in economic theory beyond overt behaviors, Mueller and Price (1990) added individual nurse factors relating to morality, emotions, and social bonds to the turnover model. They added the variable of work motivation, which they viewed, along with professionalism, as an ethical and emotional concept. They added community

participation, which they viewed, along with kinship responsibility and workgroup cohesion, as an indicator of morality and environmental constraints. In addition, they added publicity, volition, and explicitness of job plans, which they viewed as indicators of social bonds.

Gurney et al. (1997) modified the model to determine whether job satisfaction, commitment, and job intention of nurses with doctoral degrees could be predicted by exogenous variables identified as important to professionals. Gurney et al. refined the environmental factor to differentiate local and non-local job opportunity, and added hospital factors of supervisor support, mentor support, and downward communication, as well as individual nurse factors of affectivity, motivation, career orientation, and performance self-image.

Anticipated Turnover Model. Hinshaw et al. (1987) developed the Anticipated Turnover Model, the first major extension of Price and Mueller's (1981) work. They limited the first stage variables to selected individual factors identified as mobility factors, which included age, education, kinship, nursing experience, tenure, and tenure expectations. Hinshaw et al. included as control variables the hospital factor of urban or rural hospital location, the nursing unit factor of type of clinical service (i.e., unit type), and individual nurse factors of shift worked and nursing staff position. Hinshaw et al. included the following nursing unit types: critical care; medical-surgical; obstetric and gynecology (Ob/Gyn); pediatric, psychiatric and other; and multiple unit types. Nurse perceptions of the work environment, including group cohesion, control over practice, and autonomy, were included as stage two

variables. Hinshaw et al. were the first investigators to add an indicator of job stress to nursing turnover models, which they included with stage two variables. Hinshaw et al. also added a summary measure of satisfaction with dimensions of the nursing job, including pay, administrative style, professional status, and interaction with colleagues, to general job satisfaction as the two variables of the model's third stage. Job satisfaction was followed by anticipated turnover, a refinement of the standard intent to leave concept, and lastly, turnover.

Leveck and Jones (1996) made two major modifications to the Anticipated Turnover Model. First, they replaced nurse mobility factors with nurse perceptions of the unit nurse manager's management style as the exogenous model variable, becoming the first to include measures of nurse manager leadership since Weisman et al. (1981a). Second, Leveck and Jones shifted the focus of the conceptual model from the individual nurse to the nursing workgroup level, replacing the outcome variable of individual nurse turnover with nursing workgroup retention. Leveck and Jones limited the model's second stage to group cohesion and job stress, and retained Hinshaw et al.'s combination of job satisfaction dimensions and general job satisfaction as the model's third stage. Because of their shift to the nursing workgroup level, Leveck and Jones did not include variables considered individual level, such as job intention and nurse characteristics.

Organizational Dynamics Paradigm Model. Building on Hinshaw et al.'s (1987) work, Taunton et al. (1997) developed the Organizational Dynamics Paradigm Model, focusing on nursing unit nurse manager leadership. Taunton et al. included

characteristics of the unit nurse manager, hospital, unit, individual nurse, and work environment in the model. Nursing unit nurse manager characteristics were included as exogenous variables. Nurse perceptions of the hospital (i.e., control over practice, distributive justice, and promotional opportunity) were included as stage two, and nurse perceptions of the work environment were included as stage three (autonomy, communication, workgroup cohesion, and routinization). The causal order of the remaining variables was job stress, job satisfaction (general job satisfaction and satisfaction with administration), commitment, job intention, and retention. A number of nursing unit and individual nurse factors were included as correlates. The major modifications of the Organizational Dynamics Paradigm Model of both Bott et al. (1993), and Boyle et al. (1999) were to use job intention as the outcome variable and to control for unit type.

Other Models

The remaining models, which I classified as “other,” included both comprehensive models as well as models with a more limited focus. Parasuraman (1989) identified his model as comprehensive, which, although it contained nursing leadership, included limited perceptions of the nursing work environment. Exogenous variables included nursing unit factors of nursing work overload and nurse manager leadership style, while individual factors included age, tenure, and job level. Nurse perceptions of task and role conflict also were included as exogenous variables. The endogenous model variables included, in causal order, stress, job satisfaction, organizational commitment, intention to leave, and turnover.

Lake (1998) tested a three-stage nurse turnover model. Exogenous variables included the environmental factor of job opportunity, nursing unit factors of skill-mix, nurse-to-patient ratio, and RN vacancy rate, and individual nurse factors of family responsibility, education, and tenure on the job. Lake included a summary measure of job satisfaction with specific dimensions of the nursing job, although her model was unusual in including job satisfaction as an exogenous variable. Lake's model was unique in including burnout, in addition to job stress. Lake's concept of autonomy emphasizes clinical, rather than operational, decision making. Endogenous variables were limited to job intention and resignation.

In Alexander, Lichtenstein, Oh, and Ullman's model (1998), exogenous variables were limited to the individual nurse factors of age, tenure, sex, marital status, education, and position. Endogenous variables included job satisfaction, job intention, and turnover. Distinct dimensions of job satisfaction were not summarized, but were added to the model separately, including satisfaction with patients and coworker relationships, workload, professional growth opportunities, pay, autonomy, work hazards, resources, and role clarity.

Investigators focused the remaining models around very specific interests related to nursing turnover. Two models included a single exogenous job satisfaction variable. Hom and Griffeth (1991) tested a replication of Mobley's psychological model of turnover with general job satisfaction as the exogenous variable. The endogenous variables included thoughts of quitting, expected utility of withdrawal, search intentions, job search, comparison of alternatives, intentions to quit, and

turnover. Lum, Kervin, Clark, Reid, and Sirola (1998) developed a model focused on the effects of satisfaction with pay, which was hypothesized as the cause of general job satisfaction, the hypothesized cause of intent to leave.

The remaining two models were focused on the effects of group dynamics. In Decker's (1985) model, exogenous variables were limited to the individual factors of nursing experience, education, and satisfaction with nurse manager and with co-workers. Stage two, conceptualized as person-role conflict, included moral professional conflict, and satisfaction with opportunities for advancement, with pay, and with the job intrinsically. The final stages of Decker's model were general job satisfaction and intention to leave.

Cox (2001) developed a model focused on the effects of intra-group conflict on nursing units. The exogenous variables included the nursing unit factors of unit technology, number of beds per nursing unit, and percent of unit nursing staff who were RNs, while individual nurse factors included age, education, experience, and tenure. Endogenous variables included intra-group conflict, followed by job satisfaction and team effectiveness, with anticipated turnover as the outcome.

Setting and Sample

Inclusion criteria for this review required samples of nurses. Individual nurse samples in the studies included in the review were nested within nursing units, which were nested within hospitals, with one exception. Gurney et al.'s (1997) sample included members of the nursing honor society Sigma Theta Tau. Settings ranged from single site to national samples (see Table 2, p. 71). Sample sizes ranged from

135 (Mueller & Price, 1990) to 1259 nurses (Weisman et al., 1981a) for individual level analysis, and 50 (Price & Mueller, 1981) to 63 nursing units (Leveck & Jones, 1996) for workgroup level analysis. Both single site (Decker, 1985; Lum et al., 1998) and multiple site (Alexander et al., 1998) program evaluations were included. Studies reviewed used both primary and secondary data analysis. Bott et al. (1993) and Boyle et al. (1999) conducted secondary analysis of Taunton et al.'s (1997) sample. Other secondary analyses included in this review used data from studies that did not meet the inclusion criteria for this review (Alexander et al.; Curry et al., 1985; Lake, 1998; Mueller & Price, 1990).

Hospital sampling procedures were predominantly convenience, although purposive and stratified samples were included. Price and Mueller's (1981) and Curry et al.'s (1985) samples were designed to represent short-term general hospitals, the dominant type of hospital in the United States. Alexander et al. (1998) and Lake (1998) conducted secondary analyses of data from national samples. Lake's study included hospitals located in high acquired immuno-deficiency incidence cities, and Alexander et al.'s included all long-term neuro-psychiatric U.S. Department of Veteran's Affairs hospitals. The size of the community in which the hospitals were located was not always described. Price and Mueller's hospitals were located in medium sized communities, and Curry's were located in a mixture of small and medium sized. Hinshaw et al.'s (1987) hospital sample was stratified by urban and rural settings, whereas Lucas et al.'s (1993) replication study compared Hinshaw's

urban hospitals to another group of urban hospitals. Taunton et al.'s (1997), Bott et al.'s (1993) and Boyle et al.'s (1999) sample was limited to urban hospitals.

In this review, hospital samples were predominantly regional. Although the samples were distributed evenly across the United States, the East was underrepresented in terms of number of hospitals. Community size was not described as frequently as hospital size, although it appears that small communities and small hospitals may have been underrepresented. Most samples included general or community hospitals, although Lum et al. (1998) examined a pediatric hospital, and Alexander et al. (1998) examined long-term, government, psychiatric hospitals.

All samples included RNs, and most were limited to RNs, although some included licensed practical nurses (LPNs) and nursing assistants (Alexander et al., 1998; Hinshaw et al, 1987; Parasuraman, 1989; Sheridan & Vredenburg, 1979). Curry et al. (1985) included clerical staff, whereas Cavanagh and Coffin (1992), Curry et al. and Parasuraman included supervisors. Decker (1985) and Hom and Griffeth (1991) describe their samples simply as nurses. Investigators were split between limiting their samples to full-time staff, or including part-time staff. Cavanagh and Coffin selected a sample with a history of turnover, and Mueller and Price (1990) selected a sample of recently hired nurses. Taunton et al. (1997) reported on a modified sample selected to include equal numbers of stayers and leavers.

Several investigators tested models for RNs on specific types of units, such as medical-surgical (Bott et al., 1993; Hinshaw & Atwood, 1983-1985; Hinshaw et al., 1987; Lake, 1998), critical care (Bott et al., Boyle et al., 1999; Hinshaw & Atwood;

Hinshaw et al.), operating room and recovery room (Bott et al.), obstetric-gynecology (Bott et al.; Hinshaw & Atwood), pediatric (Lum et al., 1998), long-term psychiatric (Alexander et al., 1998), pediatric, psychiatric, and other (Hinshaw & Atwood), and multiple clinical services (Hinshaw & Atwood).

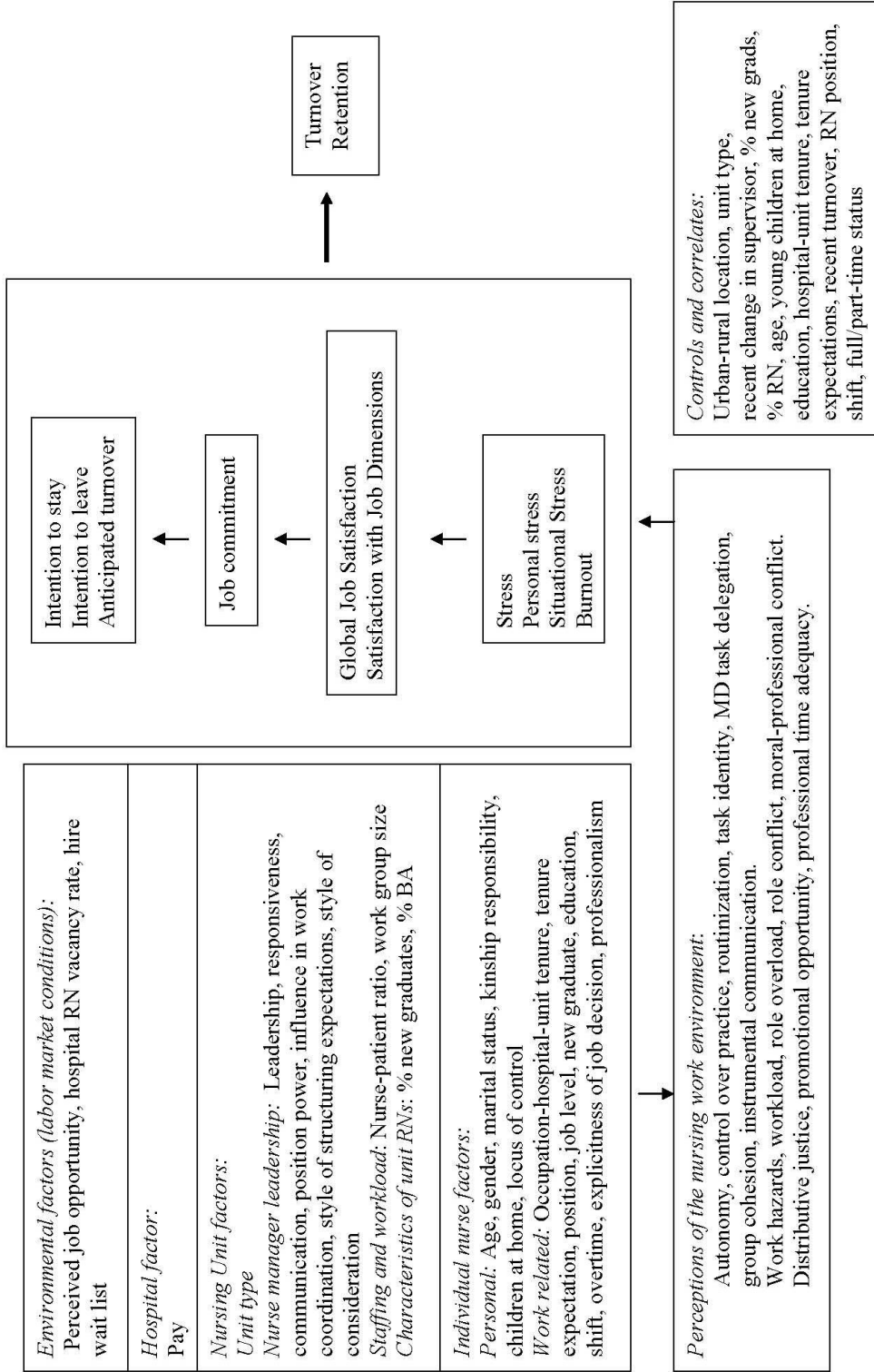
All investigators reported sample response rates greater than 59% (see Table 2, p. 71), with the exception of Parasuraman (1989), who reported a response rate of 44%, Cavanagh and Coffin (1992), who reported 80% from non-profit hospitals and 20% from for-profit hospitals, and Cox (2001), who reported a response rate of 49%.

Measurement

The following description of the measurement findings in this body of research is limited to variables that remained in the final models (see Figure 3, p. 36), and focuses primarily on the major dependent variables of job satisfaction, job intention, and turnover. Although job intention and turnover are the outcome variables of the models reviewed, I will conform to the custom in path analysis (Price & Mueller, 1981) by referring to the major intervening variables as dependent. Two data collection methods, nurse surveys and administrative data extraction, are used in this research.

Job satisfaction and other nurse attitudes and perceptions were collected by a variety of survey tools. Price (1972) described two approaches to the measurement of job satisfaction---collecting general job satisfaction data and collecting data

Figure 3
Nurse Turnover Model Variables with Significant Path Coefficients



regarding satisfaction with specific dimensions of the job. Investigators reviewed here used both approaches (see Table 3, p. 74), employing instruments measuring satisfaction with specific dimensions of the nursing job as such tools became available, or combining general job satisfaction with nursing job dimension satisfaction tools. Investigators generally used job satisfaction survey tools with prior evidence of sound validity and reliability, and provided evidence of adequate reliability from their data collection. A few, however, either did not report reliability estimates (Cavanagh & Coffin, 1992; Curry et al., 1985; Leveck & Jones, 1996; Parasuraman, 1989; Weisman et al., 1981) or reported reliability coefficients less than .70 on some subscales (Alexander et al., 1998; Cox, 2001; Gurney et al., 1997; Hom & Griffeth, 1991; Taunton et al, 1997).

Most investigators measured job intention, either intention to stay or intention to leave, with one to three item scales (see Table 4, p. 76). Hinshaw et al. (1987) measured anticipated turnover with a twelve-item scale. In general, investigators did not provide evidence of validity and reliability of the job intention scales. A few investigators used job intention as the outcome variable. Bott et al. (1993) and Boyle et al. (1999) used intention to stay, whereas Cox (2001), Decker (1998), Gurney et al. (1997), and Lum et al. (1998) used intention to leave.

Lake (1998) reported results of separate analyses using intention to leave and resignation as the outcome variables. Hinshaw et al. (1987) reported turnover as the outcome variable for every model except critical care, for which they reported anticipated turnover instead.

The outcome variable of most models was turnover or retention (see Table 5, p. 78). Investigators generally collected data regarding intention or turnover from the *hospital*. A select few investigators reported data regarding *unit* turnover (Alexander et al., 1998; Leveck & Jones, 1996; Taunton et al., 1997), resignation (Lake, 1998), or job intention (Bott et al., 1993; Boyle et al., 1999). Unit data captured nurses transferring from units, reflecting workgroup variability.

Across studies, the period of time included in the measurement of turnover or retention varied from 6 months to 22 months, making comparison of studies problematic. Variability existed within studies, as Lake (1998) reported a range of 13-22 months in the time period for turnover data collection across hospitals in her study.

Turnover or retention was obtained from administrative data by all investigators, with the exception of Cavanagh and Coffin (1992), who used self-reported months of employment in the hospital, noting the participating hospitals did not grant them access to personnel records. The reliability of administrative data, including turnover or retention, is unclear. Taunton et al. (1997) and Boyle et al. (1999) were the only investigators to report calculation of inter-rater reliability and coding error correction for administrative data. In fact, Leveck and Jones (1996) found some workgroup level administrative data collected from nurse managers, such as number of budgeted RN positions, RN vacancies, and numbers and types of full- and part-time staff, too inconsistent to include in model testing.

In addition to turnover, other data collected as administrative data included environmental, hospital, and nursing unit factors identified as exogenous variables

(see Figure 3, p. 36). Environmental factors included measures of nursing labor market conditions, such as RN vacancy rate (Lake, 1998) and the mean number of nurses on the hospital hire “wait list” over the turnover data collection period (Mueller & Price, 1990). Hospital factors included urban or rural location of hospital (Hinshaw et al., 1987). Nursing unit factors included nurse-to-patient ratio (Lake, 1998; Weisman et al, 1981), workgroup size (Curry et al, 1985), and unit type (Hinshaw et al., 1987; Leveck & Jones, 1996; Lucas et al., 1993).

Analytic Approach

Most investigators tested nursing turnover multistage models using a series of ordinary least squared (OLS) multiple regression analyses; although, more recent investigations are turning to newer statistical techniques. In addition to OLS analysis, Mueller and Price (1990) conducted logistic regression for the dichotomous turnover variable, whereas Lucas et al. (1993) used logistic regression as a cross-check of the OLS results. All eight studies published prior to 1991 used regression procedures, only five of the twelve studies published in 1991 or later did. The more recent investigators conducted latent variable modeling using structural equation modeling procedures with statistical programs such as LISREL and EQS. Cavanagh and Coffin (1992) and Homs and Griffeth (1991) used ESQ, Alexander et al. (1998), Cox (2001), Gurney et al. (1997), and Lum et al. (1998) used LISREL. Lake (1998) tested her turnover model using OLS, logistic regression, and proportional hazards regression, and tested the intention model using ordered logit analysis.

The predominant level of analysis in this body of research is the individual level. Two models were tested using a nursing workgroup level of analysis. Price and Mueller (1981) tested their landmark nursing turnover model at both the individual and workgroup levels of analysis. Leveck and Jones' (1996) study included a multistage model and analysis at the workgroup level.

Results of Model Testing

I describe the results of model testing in terms of measures of the success of each model overall, as well as the relative importance of individual model variables. Table 6 (p. 80) presents the squared multiple correlation coefficients (R^2), an estimate of the percent of variance in outcome variables explained by the model overall. Adjusted R^2 takes into account sample size and number of model variables. Although R^2 is available in both OLS multiple regression and in SEM (Musil, Jones, & Warner, 1998), it is seldom reported for SEM results. Rather, goodness of fit indices are reported, for which values of at least .90 are considered evidence of acceptable fit of the empirical data to the hypothesized model (Musil et al.).

Tables 7-11 (pp. 82-105) provide variables with path coefficients that were significant in the final models. In OLS multiple regression, path coefficients generally are presented as standardized partial correlation coefficients, or *beta* weights, which are similar to SEM path coefficients (Musil, Jones, & Warner, 1998). Tables 7-8 (pp. 82-90) present the path coefficients, or effects, of exogenous variables on the major dependent variables: stress, job satisfaction, commitment, intention, and turnover. Table 9 (p. 91) presents the effects of exogenous variables on perceptions

of the work environment, and Table 10 (p. 94) presents the effects of nurse perceptions of the work environment on the major dependent variables. Control variables are included with exogenous variables in Tables 7-9 (pp. 82-93), as variables are identified inconsistently as controls across the models. Finally, Table 11 (p. 101) presents the effects of intervening variables on the major dependent variables.

Overall Model Success

Considerable difference was reported in the amount of variance in turnover explained by the models tested (see Table 6, p. 80). Several models explained 10% or less of the turnover variance, including models reported by Sheridan & Vredenburg (1979), Weisman et al. (1981a), Hinshaw et al. (1987), and Parasuraman (1989). All other models were more successful, explaining as much as 29% of the adjusted turnover variance (Lucas et al., 1993) with individual level analysis, and 49% with workgroup level analysis (Leveck & Jones, 1996). Of those who did not report the R^2 values, Mueller and Price (1990) used logistic regression for the turnover variable, whereas Cavanagh & Coffin (1992) and Hom & Griffeth (1991) conducted SEM and did not report the squared multiple correlation coefficient. In SEM analysis, Cavanagh and Coffin (1992) reported a Bentler-Bonnett fit index of .98, Alexander et al. (1998) reported an adjusted goodness of fit index of .99, and Hom and Griffeth (1991) reported a normed fit index of .87.

The amount of job intention variance explained was consistently higher than the amount of turnover variance. Although Price & Mueller (1981) explained as little

as 2% more job intention than turnover variance, Parasuraman (1989) explained six times more job intention than turnover variance (see Table 6, p. 80). Although the highest job intention R^2 was .56 (Gurney et al., 1997), and several models reported R^2 or Adjusted R^2 values greater than .40, the majority of models explained 20% to 40% of job intention variance. Lum et al. (1998) conducted SEM, reporting a goodness of fit index of .93, and not reporting an R^2 .

Table 6 (p. 80) also includes the amount of variance in job satisfaction and commitment explained by the models. In general, these models are most successful in explaining job satisfaction, particularly satisfaction with specific job dimensions. Also, the models explain a similar amount of the variance in organizational commitment as the variance in job intention.

Effects of Predictor Variables

Direct Effects of Exogenous Variables on Stress, Job Satisfaction, Commitment, Intention, and Turnover. Environmental, hospital, nursing unit, and individual nurse factors generally had significant effects on consistent dependent variables in the expected direction across models. A limited number of different indicators of nurse labor market conditions, or job opportunities, were included as the environmental factor in the models reviewed (see Table 7, p. 82). Job opportunity had a consistent effect on intention, with increased opportunity being related to greater intent to leave (Curry et al., 1985; Gurney et al., 1997; Lake, 1998) and to less intent to stay (Bott et al., 1993; Cavanagh & Coffin, 1992; Mueller, & Price, 1990; Price & Mueller, 1981; Taunton et al., 1997), or decreased opportunity being related

to greater intent to stay (Boyle et al., 1999). The opportunity indicator had a direct effect on turnover in only two models, with increased perception of job opportunity related to increased turnover (Price & Mueller) and increased hospital hire wait list related to decreased turnover (Mueller & Price). Increased opportunity was related to decreased commitment (Bott et al.; Curry et al.; Mueller & Price; Taunton et al.) and job satisfaction (Bott et al.; Cavanagh & Coffin; Gurney et al.; Mueller & Price; Price & Mueller; Taunton et al.), as well as increased stress (Bott et al.; Taunton et al.).

Hospital factors included increased income, which was positively related to intent to stay (Cavanagh & Coffin, 1992; Price & Mueller, 1981) and negatively related to intent to leave (Curry et al., 1985; Lum et al., 1998) (see Table 7, p. 82). Increased income had a seemingly unexpected negative effect on job satisfaction (Cavanagh & Coffin, 1992; Curry et al., 1985; Mueller & Price, 1990). Curry et al. found no correlation between pay and job satisfaction. Satisfaction with pay, however, had the expected positive effect with job satisfaction (Lum et al., 1998).

Variables of urban location, academic, and large facilities were included as control variables. Urban hospitals were associated with greater anticipated turnover (Hinshaw & Atwood, 1983-1985), academic facilities with lower job satisfaction, and large facilities with lower job commitment (Gurney et al., 1997) (see Table 7, p. 82).

Nursing unit factors included nurse-to-patient ratios, which were negatively related to intent to leave (Weisman et al., 1981) and turnover (Lake, 1998), as expected (see Table 7, p. 82). Most other nursing unit indicators were included as control variables by most investigators. A higher percent of nursing unit RNs with

BA degrees was related to increased job satisfaction (Weisman et al., 1981a), and a higher percent of unit staff who were RNs was related to increased nursing unit retention (Taunton et al., 1997), as expected. Also, higher percent of nursing unit RNs who were new graduates were related to decreased intent to leave (Weisman et al.), and decreased retention (Taunton et al.). Nursing unit type was associated with both job satisfaction and stress in interesting directions. For instance, medical-surgical nursing units were associated with decreased job satisfaction and increased stress (Leveck & Jones, 1996; Lucas et al., 1993), whereas obstetric and gynecology nursing units were associated with increased job satisfaction (Hinshaw & Atwood, 1983-1985). Critical care nursing units were related inconsistently to both increased job satisfaction and stress (Hinshaw & Atwood; Lucas et al., 1993).

Unit nurse manager leadership indicators were related to all major dependent variables. These relationships were all in the expected direction and were most frequent with job satisfaction and job intention (see Table 7, p. 82). Positive nurse manager leadership was associated with greater job satisfaction (Bott et al., 1993; Boyle et al., 1999; Decker, 1985; Leveck & Jones, 1996; Taunton et al., 1997; Weisman et al., 1981a) and greater intent to stay (Boyle et al.; Bott et al., 1993; Taunton et al.). Positive leadership also was associated with decreased stress (Bott et al.; Boyle et al.; Taunton et al.), and increased job commitment (Gurney et al., 1997; Parasuraman, 1989). A positive, direct relationship between nurse manager consideration and retention also was found by Taunton et al.

Individual factors, which included personal (e.g., age, gender, marital status, kinship responsibility, locus of control, affectivity) and work related (e.g., nursing, hospital, or unit tenure, expectations of tenure, position, education, shift) indicators, frequently were most related to job satisfaction and intention, and were treated as control variables in many, but not all models (see Table 8, p. 87). Age had the most consistent effect across models on job intention, with higher age being associated with greater intent to stay (Price & Mueller, 1981) or less intent to leave (Cox, 2001; Lucas et al., 1993). Both Curry et al. (1985) and Alexander et al. (1998) found a direct negative age effect on turnover. In other models, older age had a positive effect on job satisfaction (Lucas et al.; Price & Mueller) and commitment, and a negative effect on stress (Parasuraman, 1989).

Kinship responsibility and young children at home had a consistent, expected effect on job intention, in that greater kinship responsibility or more young children at home was related to higher intention to stay (Cavanagh & Coffin, 1992; Price & Mueller, 1981) or lower intention to leave (Curry et al., 1985; Lake, 1998; Lum et al., 1998). Kinship responsibility had a positive effect on job satisfaction as well (Cavanagh & Coffin; Curry et al.; Price & Mueller). Internal locus of control (Weisman et al., 1981) and positive affectivity (e.g., the degree of the person's affirmative mood) (Gurney et al., 1997) were associated with greater job satisfaction, and negative affectivity (Gurney et al.) was associated with lower job satisfaction.

Individual nurse work related indicators generally were associated with job intention. Greater tenure, either in the nursing profession, at the hospital, or on the

nursing unit, was positively related to less intent to leave (Decker, 1985; Gurney et al., 1997; Hinshaw & Atwood, 1983-1985; Lake, 1998), greater intent to stay (Price & Mueller, 1981), or nursing unit retention (Leveck & Jones, 1996; Taunton et al., 1997), and negatively related to turnover (Sheridan & Vredenburg, 1979; Weisman et al., 1981; Lake). Surprisingly, Hinshaw & Atwood found higher initial expectations of tenure associated with higher anticipated turnover, and Price & Mueller found higher turnover rates on nursing units with more tenured nurses. In addition, greater tenure was found to be associated with lower stress (Lucas et al., 1993).

This body of research provided some evidence that the relationship of tenure and tenure expectation with model outcomes is nonlinear. Gurney et al. (1997) found a positive relationship between tenure and intent to leave, and negative relationship between tenure squared and intent to leave. Boyle et al. (1999) found a positive relationship between a tenure expectation of greater than five years with intent to stay, and a negative relationship between a tenure expectation of less than two years with intent to stay.

Weisman et al. (1981) found higher job position and being in a first nursing position associated with greater intent to leave, although Parasuraman (1989) found higher job level associated with higher job commitment. Findings regarding education were more consistent. Higher education was associated with lower intent to stay (Mueller, & Price, 1990; Price & Mueller, 1981), higher turnover (Alexander et al., 1998; Cavanagh & Coffin, 1992; Price & Mueller), and greater intent to leave (Alexander et al.; Decker et al., 1985; Lum et al., 1998). Rotating shifts were

associated with higher stress (Lucas et al., 1993), evening and night shifts with higher levels of job satisfaction (Hinshaw & Atwood, 1983-1985; Hinsahw et al., 1987; Lucas et al., 1993), and 12 hour shifts with lower intent to leave (Lum et al., 1998). Higher levels of professionalism and work motivation were associated with greater job satisfaction and commitment (Curry et al., 1985, Gurney et al., 1997; Mueller & Price).

Perceptions of the Nursing Work Environment. Because nurse attitudes and perceptions of the nursing work environment were considered alternately exogenous or intervening variables across the models reviewed, I present both the effect of exogenous variables on these nurse perceptions (Table 9, p. 91) and the effects of nurse perceptions on the major dependent variables (Table 10, p. 94). The environmental factor of opportunity elsewhere was related negatively to group cohesion (Bott et al., 1993; Taunton et al., 1997) (see Table 9, p. 91). Nursing unit factors of beds per unit and percent of unit staff who were RNs were associated positively with nursing unit morale and interpersonal relations (Cox, 2001). Unit nurse manager indicators were related primarily to autonomy and group cohesion. Nurse manager responsiveness (Weisman et al., 1981), work coordination influence (Taunton et al.), and consideration (Bott et al.; Boyle et al., 1999; Taunton et al.) were related positively to autonomy, whereas position power (Bott et al.) and leadership attention (Parasuraman, 1989) were associated negatively with autonomy. Structuring expectations (Bott et al.) and consideration (Bott et al.; Boyle et al.; Taunton et al.) were associated positively with group cohesion.

Perceptions of the work environment generally had consistent and expected effects on model dependent variables (see Table 10, p. 94). Autonomy and control over practice was related positively to job satisfaction (Bott et al., 1993; Cavanagh & Coffin, 1992; Hinshaw & Atwood, 1983-1985; Price & Mueller, 1981; Taunton, 1997; Weisman et al., 1981) and related negatively to stress (Bott et al.; Boyle et al., 1999; Taunton et al., 1997) across a number of models, whereas centralization (Curry et al., 1985) was related negatively to job satisfaction. Interestingly, autonomy as job characteristic (Hinshaw & Atwood, 1983-1985) was associated negatively with job satisfaction.

Routinization was related negatively to job satisfaction (Bott et al., 1993; Curry et al., 1985; Price & Mueller, 1981; Taunton et al., 1997) in all models but one (Cavanagh & Coffin, 1992), whereas task identity (Mueller & Price, 1990) and variety (Gurney et al., 1997) were associated positively with job satisfaction. Unexpectedly, routinization was related to greater intent to stay (Price & Mueller; Mueller & Price).

Integration and workgroup cohesion generally had positive associations with job satisfaction (Bott et al., 1993; Boyle et al., 1999; Curry et al., 1985; Gurney et al., 1997; Hinshaw & Atwood, 1983-1985; Leveck & Jones, 1996; Lucas et al., 1993; Mueller & Price, 1990; Taunton et al., 1997;) and negative associations with intent to leave (Alexander et al., 1998; Curry et al., 1985; Hinshaw & Atwood; Lucas et al.) and turnover (Alexander et al.). Instrumental communication was associated with lower stress (Bott et al.; Boyle et al.; Taunton et al.), higher job satisfaction (Curry et

al.; Price & Mueller, 1981) and greater job commitment (Curry et al.; Mueller & Price).

Greater role overload and role conflict was associated with greater stress and less job satisfaction (Decker, 1985; Parasuraman, 1989). Satisfaction with role clarity, work load, and work hazards were associated with less intent to leave (Alexander et al., 1998). Greater sense of distributive justice was associated with lower stress (Bott et al., 1993; Taunton et al., 1997) and greater job satisfaction (Bott et al.; Curry et al., 1985; Price & Mueller, 1981; Taunton et al.) and job commitment (Curry et al.; Gurney et al., 1997). Higher promotional opportunity was associated with greater job satisfaction (Bott et al.; Cavanagh & Coffin, 1992; Curry et al.; Decker; Gurney et al.; Price & Mueller; Taunton et al.) and less intent to leave (Decker; Gurney et al.). Satisfaction with professional growth opportunities was associated with lower intent to leave (Alexander et al.), and too little professional time adequacy was associated with lower job satisfaction (Weisman et al., 1981).

Direct Effects of Intervening Variables on Job Satisfaction, Commitment, Intention, and Turnover. Intervening variables exhibited even more consistent and expected relationships with dependent variables than did the relationships of the exogenous variables (see Table 11, p. 101). Stress consistently was associated negatively with job satisfaction (Bott et al., 1993; Boyle et al., 1999; Hinshaw & Atwood, 1982-1985; Leveck & Jones, 1996; Lucas et al., 1993; Parasuraman et al., 1989; Taunton et al., 1997). Stress was associated with less intention to stay (Taunton et al.), and burnout was associated with greater intention to leave (Lake, 1998). An

unexpected result was found for medical-surgical nurses, for whom higher stress was associated with less intent to leave (Hinshaw et al., 1987).

Job satisfaction was the strongest predictor of job commitment and job intention across most models. As expected, greater job satisfaction was associated with greater job commitment (Bott et al., 1997; Curry et al., 1985; Gurney et al., 1997; Mueller & Price, 1990; Taunton et al., 1997), lower intent to leave (Alexander et al., 1998; Curry et al.; Decker, 1985; Hinshaw & Atwood, 1983-1985; Hinshaw et al., 1987; Hom & Griffeth, 1991; Lucas et al., 1993; Parasuraman, 1989; Weisman et al., 1981), and greater intent to stay (Bott et al.; Boyle et al., 1999; Cavanagh & Coffin, 1992; Lake, 1998; Price & Mueller, 1981; Taunton et al.). Nursing unit morale and interpersonal relations also were associated strongly with lower anticipated turnover (Cox, 2001).

Job commitment was associated with less intent to leave (Curry et al., 1985; Gurney et al., 1997; Lum et al., 1998; Parasuraman, 1989) and greater intent to stay (Bott et al., 1993; Mueller & Price, 1990; Taunton et al., 1997). Job intention was the strongest predictor of turnover, in the expected directions. Intent to leave was associated positively with turnover (Alexander et al., 1998; Curry et al., 1985; Hinshaw & Atwood, 1985; Hinshaw et al., 1987; Lake, 1998; Lucas et al., 1993; Parasuraman, 1989; Weisman et al., 1981), and intent to stay was associated negatively with turnover (Mueller & Price, 1990; Price & Mueller, 1981). Similarly, intent to leave was associated negatively with retention (Hom & Griffeth, 1991) and intent to stay was associated positively with retention (Taunton et al., 1997). The

positive association between intent to stay and the turnover variable in Cavanagh and Coffin's study (1992) is quite surprising.

Discussion

Researchers from a variety of disciplines have been examining employee turnover for nearly a century. In the 1970's, researchers began testing multistage models of turnover. Price and Mueller's (1981) model and extensions [i.e., Anticipated Turnover Model (Hinshaw et al., 1987) and Organizational Dynamics Paradigm Model (Taunton et al., 1997)] remain the defining nursing turnover models. Figure 2 (p. 25) presents an overview of multistage nursing turnover models, illustrating the categories of variables common across models. Figure 3 (p. 36) presents a more detailed view, listing significant model variables within each category across all models. The greatest variation across models is found in the exogenous variables, which generally include environmental, hospital, nursing unit, and individual factors. General agreement across models is found in the intervening and outcome variables, as job satisfaction is the best predictor of job intention, which is the best predictor of turnover.

The ability of researchers to predict outcomes using turnover models has improved over time, based on the amount of variance in the outcome explained by the model variables (see Table 5, p. 78). The early models tested before Price and Mueller's (1981) work were able to explain only 7-8% of the variance in turnover. Price and Mueller's model doubled the variance explained by including specific dimensions of the nursing job as exogenous variables. Although the Anticipated

Turnover Model (Hinshaw et al., 1987) added stress and satisfaction ratings of specific dimensions of the nursing job as intervening variables, and began to examine differences among unit types, the model's ability to predict outcomes was similar to the early models. Subsequently, Leveck and Jones (1996) added measures of nursing unit leadership as exogenous variables to the Anticipated Turnover model and, using a nursing workgroup level analysis, were able to predict as much variance as Price and Mueller's workgroup level analysis. Researchers using the Organizational Dynamics Paradigm Model (Bott et al., 1993; Boyle et al., 1999; Taunton et al., 1997) have been able to explain the highest amount of variance in outcomes. Exogenous model variables included measures of organization (hospital) and unit leadership, while intervening model variables included measures of stress and perceptions of specific dimensions of the nursing job. Extending the Organizational Dynamics Paradigm Model, Bott et al. and Boyle et al. examined intent to stay as the model outcome. Unit workload was an important variable in few models (Lake, 1998; Weisman et al., 1981).

Based on this body of research, it appears we can explain about 50% of job satisfaction and job intention variance and 20% of turnover variance for individual level analyses. For workgroup level analysis, we can explain about 70% of job satisfaction and job intention variance and 50% of turnover variance. A large amount of the variance of job satisfaction, job intention, and, in particular, turnover, remains unexplained. In addition, attempts to synthesize the findings of the studies reviewed

are challenged by a number of conceptual, methodological, sampling, and measurement inconsistencies across studies.

Conceptual Framework

This body of literature focuses on either positive or negative behavioral outcomes (i.e., turnover, resignation, or retention) or attitudes (i.e., intention to stay, intention to leave, or anticipated turnover). The relationship between the positive and negative behavior or attitude is not clear. It does not seem reasonable to expect that predictors of high turnover and low turnover or retention, or predictors of intent to stay and intent to leave will be the same.

Specific dimensions of the job (i.e., work routine, group cohesion or integration, control over practice, participation, or autonomy) are an important part of turnover models, although they function differently in the models depending on whether they are conceptualized as exogenous or intervening variables. As exogenous variables, they are thought to function as indicators of the job itself (Curry et al., 1985; Decker, 1985; Parasuraman, 1989; Price & Mueller, 1981; Sheridan & Vredenburg, 1979; Weisman et al., 1981). As intervening variables, they reflect nurse perceptions or attitudes, generally satisfaction (Bott et al., 1993; Boyle et al., 1999; Hinshaw et al., 1987; Lake, 1998; Leveck and Jones, 1996; Lucas et al., 1993; Taunton et al., 1997; Weisman et al., 1981). It is clear that pay and satisfaction with pay function differently in models due to the high correlation of pay with other exogenous variable, such as tenure (Mueller & Price, 1990). It seems reasonable to expect similar differences in the function of other job dimensions depending on how

they are conceptualized, although it is not clear whether it is more useful in predicting turnover to measure perceptions of or satisfaction with dimensions of the job.

The greatest variability in the models is found among the exogenous variables. Many differences also are found in whether variables are viewed as theoretical model variables or control. For example, across the models, important nurse characteristics (e.g., age, children at home, tenure, education, and position) are generally included, although with little consistency as to whether they are exogenous or control variables.

Unit Type

Unit type differences in turnover have not been examined extensively. Weisman (1982), Weisman et al. (1981a, 1981b) first controlled for unit type using broad categories of in-patient or out-patient unit. Subsequently, researchers examining the Anticipated Turnover and Organizational Dynamics Paradigm models controlled for more specific unit types (i.e., medical-surgical, critical care, operating room, and obstetric-gynecology) with intriguing results. Hinshaw et al. (1987), Lucas et al. (1993), and Leveck and Jones (1996) found that medical-surgical nurses experienced higher levels of job stress than critical care nurses, particularly in feelings of clinical competence (Hinshaw et al.). Researchers examining the Organizational Dynamics Paradigm model found that direct effects of different leadership characteristics on intent to stay varied by unit type. A greater degree of structuring expectations increased intent to stay for medical-surgical nurses (Bott at

al., 1993), whereas greater position power and influence over work coordination increased intent to stay for critical care nurses (Bott et al.; Boyle et al., 1999).

Level of Model and Analysis

Researchers tested nursing turnover models at the individual level of analysis, with two exceptions. Price and Mueller (1981) felt their model was applicable at the individual, nursing unit, and hospital levels, and they reported analysis at all three levels. They did interpret the results differently, noting, for example, that unit level findings described a nursing unit work context. Although acknowledging that the unit level results held important policy implications in that unit level interventions would likely be most practical, they nevertheless felt that focusing on individual level methodology improvements would be most fruitful. Fifteen years later, Leveck and Jones (1996) conceptualized their model outcomes, unit staff retention and unit management style, as workgroup level variables, and aligned their study methodology with their model. It is interesting to note that investigators of the psychiatric nurse model (Alexander et al., 1998) also explored a multilevel model of intention to quit using a broader psychiatric care personnel sample (Jinnett & Alexander, 1999).

Setting and Sample

Inconsistencies among samples present challenges in comparing results across studies. In addition to RN staff, some samples included LPNs (Alexander et al., 1998; Curry et al., 1985; Hinshaw et al., 1987; Parasuraman, 1989; Sheridan & Vredenburg, 1979) nursing assistants (Alexander et al.; Hinshaw et al.; Sheridan & Vredenburg) supervisors (Cavanagh & Coffin, 1992; Curry et al.; Parasuraman), and

even clerks (Curry et al.). One sample was limited to staff with a history of turnover (Cavanagh and Coffin), while another sample examined equal number of stayers and leavers (Taunton et al, 1997).

Some samples were limited to nurses from one unit type, e.g., psychiatric units (Alexander et al., 1998), critical care (Boyle et al., 1999), or pediatric units (Lum et al., 1998). Alexander et al. and Boyle et al. made unit type selections based concerns of low levels of job satisfaction and/or shortages in those areas. In contrast, Lum et al. did not describe the conceptual basis for examining pediatric units.

The only two national samples (Alexander et al., 1998; Lake, 1998) were both secondary analysis of data collected from purposive samples designed for unrelated primary studies. Lake's sample originated from an outcomes study of the organization of hospital AIDS care (Aiken, Lake, Sochalski, & Sloan, 1997). Alexander et al.'s sample originated from an evaluation of care in VA long-term neuro-psychiatric hospitals.

Measurement

Measurement issues of most concern in this body of research involve turnover. Serious issues exist with the turnover outcome, including the unknown quality of administrative data and different operational definitions, such as whether leave of absence, promotion, or nursing unit transfer were included, and different number of measurement months ranging from six (Hom & Griffeth, 1991) to twenty-two (Lake, 1998). The number of months of measurement even ranged from 13-22 within the study by Lake (1998).

Measurement issues are less of a concern for the job intention attitude. Most investigators used very similar 1-3 item scales to measure job intention. Only Mueller & Price (1990), Hinshaw et al. (1987), Hom & Griffeth (1991), and Lucas et al. (1993) used longer, more nuanced instruments, and it is not clear that these instruments were major model improvements.

Important measurement issues involve the job satisfaction variable. From this body of literature, it remains unclear whether a general job satisfaction measure or a measure of satisfaction with different dimensions of the job is more useful. If using a measure of satisfaction with different dimensions of the job, it is not clear if the dimensions of the job should be entered into the model separately, or if a summary of job satisfaction across all measures should be entered.

Analysis

Inconsistencies in analysis and reporting results present challenges in comparing findings across studies. It is particularly difficult for the non-statistician to directly compare the overall models using regression path analysis with those using structural equation modeling, which do not provide a variance explained statistic. In addition, differences in presentation of regression path analysis results made comparison of some studies difficult. For instance, some researchers reported R^2 (Decker, 1985; Hinshaw et al., 1987; Sheridan & Vredenburg, 1979; Weisman et al., 1981;), while Lake (1998), Leveck and Jones (1996), and Lucas et al. (1993) reported adjusted R^2 exclusively. Difference in presentation of results was a particular problem in Cavanagh et al.'s (1992) replication of Price and Mueller's (1981)

regression path analysis. Cavanagh et al. reported results from structural equation modeling as well as some path coefficients, but did not provide the R^2 values needed for a direct comparison of amount of variance explained. A few researchers did not include a comprehensive path coefficient table (Hinshaw et al., Lucas et al., Leveck et al., and Bott et al. (1993)). Of all investigators included in this review, only Mueller & Price (1990), Bott et al. (1993), Parasuraman (1989), and Lake (1998) chose not to provide an illustration of the final path diagram. Taunton, et al. (1997), Bott et al., and Boyle et al. (1999) were unique in presenting the direct, indirect, and total effects of turnover as semi-partial, rather than partial correlation coefficients.

RN Workgroup Intent to Stay Model

I based my model (see Figure 1, p. 2) on the findings of my review of nursing job intention and turnover models found in the literature. See Figure 2 (p. 25) for an overview of the categories of variables common across the models reviewed, and Figure 3 (p. 36) for the significant variables within each category. My review recognizes Price and Mueller's (1981) model and extensions [i.e., Anticipated Turnover Model (Hinshaw et al., 1987) and Organizational Dynamics Paradigm Model (Taunton et al., 1997)] as the defining nursing turnover models.

Price and Mueller (1981) began with a general turnover model, which included exogenous predictors (i.e., environment, organization, group, and individual factors), which predicted job satisfaction, which predicted job intentions, which in turn predicted turnover. To this general format, Price and Mueller added a comprehensive list of perceptions of the nursing job. Hinshaw et al. (1987), in the

first major extension of Price and Mueller's model, limited the exogenous variables to individual "mobility" factors, added a job satisfaction measure that was specific to the nursing job, and began to look at differences among nursing unit types. Leveck and Jones (1996) added measures of nursing unit leadership, and used a unit level approach. In the Organizational Dynamics Paradigm Model, Taunton et al. (1997) focused on hospital organization and unit leadership, while refinements (Bott et al., 1993; Boyle et al., 1999) examined intent to stay as the outcome. Other researchers (Lake, 1998; Weisman et al., 1981) found unit workload to be an important variable.

Based on this body of research, the RN Workgroup Intent to Stay Model (Figure 1, p. 2) using a nursing workgroup level approach, several categories of exogenous variables predict RN workgroup job satisfaction with specific dimensions of the nursing job, which predicts the outcome of RN intent to stay. Exogenous variables include hospital leadership and workgroup predictors. Exogenous workgroup predictors include unit leadership, work context, and RN diversity. Work context predictors include measures of nursing workload.

Outcome Variable

The model outcome is RN workgroup intent to stay on the unit, which has two important advantages as an outcome measure over turnover. First, important unresolved measurement issues surround the collection of turnover administrative data such that the ability to collect valid, reliable, and comparable turnover data is problematic. The second advantage involves the possibility of moving beyond testing conceptual models to interventional research. Consistently, intent to stay has

been the best predictor of turnover. Because we have a significantly better understanding of the predictors of intent to stay than turnover, we should be able to design more effective interventions for intent to stay attitudes than for turnover behavior. Studying intent to stay enables researchers to assess factors that may affect retention before nurses actually leave the hospital or the nursing unit (Bott et al., 1993; Boyle et al., 1999).

Control Variables

Conceptually, unit type is the central control variable in the RN Workgroup Intent to Stay Model (see Figure 1, p. 2). It is clear that differences exist in turnover among unit types (Buerhaus, Staiger, & Auerbach, 2000b), although the determinants of those differences are not well established. The RN Workgroup Intent to Stay Model theorizes that unit type differences in RN workgroup nurse leadership, work context, and diversity lead to differences in job satisfaction and intent to stay.

Hospital nursing unit types, which parallel medical, surgery, pediatrics, and other medical specialties, are characterized by important differences in nursing tasks, role expectations, social structure, and norms (Leatt & Schneck, 1984), as well as social milieu and multidisciplinary team relations (Adams & Bond, 1997). Although few nursing turnover models have included unit type, a number of researchers have explored unit type relationships with stress or burnout (Cameron, Horsburgh, & Armstrong-Stassen, 1994; Cronin-Stubbs & Rooks, 1985; Leatt & Schneck, 1980), job satisfaction (Boyle, Miller, Gajewski, Hart, et al., 2006; Cameron et al., Ingersoll, Olsan, Drew-Cates, DeVinney, & Davies, 2002; Wakefield, Curry, Price, Mueller, &

McCloskey, 1988), and turnover (Wakefield et al.). Effective interventions to impact retention will need to target the specific needs of nurses practicing within types of units.

A number of hospital characteristics also are controlled, including Magnet designation, metropolitan area location, hospital size, ownership, and teaching status (see Figure 1, p. 2). Although only metropolitan area location had been an important control variable in the models reviewed, it seems reasonable to consider that nursing environments may vary across these hospital characteristics. The RN Workgroup Intent to Stay Model was the first to include Magnet designation in a nursing turnover model. Magnet designation, awarded by the ANCC (ANCC, 2006; Urden & Monarch, 2002), has been linked to nursing and patient outcomes in a growing body of research (Scott, Sochalski, & Aiken, 1999).

Intervening variables

The intervening variables in my model are RN workgroup job enjoyment and satisfaction with dimensions of the nursing job (see Figure 1, p. 2). With the exception of the earliest model reviewed (Sheridan & Vredenburg, 1979), job satisfaction has been shown to be one of the most important model variables, and the refinement of this variable has characterized the advancement of this research. Weisman et al. (1981a, 1981b) included satisfaction with job dimensions, Price and Mueller (1981) included general job enjoyment and perceptions of dimensions of the nursing job, and Hinshaw et al. (1987) included general job enjoyment and satisfaction with dimensions of the nursing job.

Exogenous variables

Exogenous variables in my model include hospital RN factors and RN workgroup factors (see Figure 1, p. 2). Hospital RN factors include satisfaction with nursing administration, professional development, and autonomy. RN workgroup factors include nurse leadership, work context, and diversity indicators. Nurse leadership, the factor that Leveck et al. (1996) used to strengthen the Anticipated Turnover Model, is included in the RN Workgroup Intent to Stay Model as satisfaction with nurse management, adequacy of RN orientation, and RN influence in scheduling. Work context indicators include patient-to-RN ratio, a more intuitive ratio than nurse-to-patient ratio, which Weisman (1982), Weisman et al. (1981a, 1981b), and Lake (1998) found to be important. Other work context indicators included are percent of nursing care supplied by RNs; perceptions of appropriateness of RN assignments, change in unit overtime needs, enough time with patients, time to document, and staffing effect on unit admissions or discharges; as well as percent of RNs working ≤ 12 hours last shift, taking a meal break, and not floating off home unit. RN workgroup diversity indicators include age, unit tenure, education, certification, shift worked, and schedule rotation. This is the first RN job intention model to include workgroup diversity. Previous models have found the RN characteristics of age, unit tenure, education, certification, shift worked, and schedule rotation important.

Multilevel Approach

A multilevel approach is well-suited for the phenomena of RN workgroup intent to stay on the nursing unit. Multilevel research slices organizations into individuals, groups, and organizations, which, in this study, include individual RNs, RN workgroups defined by RN nursing unit assignment, and hospitals. According to Kozlowski and Klein (2000), a multilevel approach is appropriate for a phenomenon that (a) is influenced by higher-level organizational entities (i.e., hospitals); (b) reflects the actions and cognitions of lower-level organizational entities (i.e., individual RNs); and (c) has been extensively explored.

An essential aspect of multilevel model specification is the identification of the conceptual level and the level of origin of each model construct (Kozlowski & Klein, 2000). The RN Workgroup Intent to Stay Model includes constructs which are conceptualized and originate at the same level, and constructs which are conceptualized at one level, yet originate at a different (i.e., lower) level. Kozlowski and Klein label the former global constructs, and the latter emergent constructs. Global constructs originate in and are conceptualized at the same level, while emergent constructs originate in the individual level and are conceptualized at a higher level. Constructs in the model originate at all three levels, and are conceptualized at either the RN workgroup or hospital level. The levels of origin and conceptualization of each model construct are presented in Table 12 (p. 106) and discussed in the following paragraphs.

Global Constructs

Single-level, global constructs are objective, observable characteristics. Both hospital and RN workgroup global constructs are included in the RN Workgroup Intent to Stay Model (see Table 12, p. 106). Hospital level global constructs include Magnet designation, metropolitan area, number of beds, ownership, and teaching status. RN workgroup global constructs include unit type, patient-to-RN ratio, and percent of nursing hours supplied by RNs. Patient-to-RN ratio is an objective measure of nursing unit workload, and percent of nursing hours supplied by RNs measures nursing skill mix on the unit.

Emergent Constructs

Emergence is derived from theories of chaos, self-organization, and complexity science (Kozlowski & Klein, 2000). The fundamental assumption of emergence is that lower-level data can be combined to represent higher-level phenomena (Bliese, 2000). In organizational research, emergence is used to capture how individuals contribute to group-level or organization-level constructs. Emergent phenomena originate in the cognition, affect, behavior, and characteristics of individuals, which then are amplified by interactions among individuals before becoming manifest as higher-level, collective phenomena (Kozlowski & Klein).

Kozlowski and Klein (2000) describe the process of emergence as a continuum that ranges from *composition*, based on assumptions of *isomorphism*, to *compilation*, based on assumptions of *discontinuity*. Through the process of composition, similar individual level contributions converge to form an essentially

identical higher-level phenomenon. In contrast, through the process of compilation, related but different individual contributions combine to form a pattern or configuration that characterizes the higher-level collective as a whole. In the RN Workgroup Intent to Stay Model (see Table 12, p. 106), emergent processes range from composition emergence, in which the higher-level construct is identical to its origin, to fuzzy emergence, in which the higher-level construct is both related to and different from its origin, to compilation emergence, in which the higher-level construct is different from its origin.

Composition emergence. In composition emergence, individual contributions are thought to converge as a function of processes occurring in the group, such as selection, attrition, socialization, interaction, and shared experiences (Kozlowski & Klein, 2000). Emergent composition models capture individual consensus, or restricted within- group variance. Chan (1998) differentiated direct consensus and referent shift consensus based on the item referent used to create the construct. The most familiar form is direct consensus, which originates in self-referenced survey items. Direct consensus constructs in the model include RN workgroup perceptions of the adequacy of RN orientation, RN influence in scheduling, appropriateness of RN assignments, and change in unit overtime needs (see Table 12, p. 106). Referent shift consensus constructs, which originate in group-referenced survey items, include job satisfaction scales.

Fuzzy emergence. A form of emergence sharing aspects of both composition and compilation is captured by the term fuzzy emergence (Kozlowski & Klein, 2000).

Here, individual contributions to the higher-level construct are pooled, but differences in the amount of individual contribution are unconstrained. The individual level original construct can indicate the dichotomous presence or absence of an event or attitude that is influenced by just a few individuals (Kozlowski & Klein). The aggregate variable contains higher-level contextual influences not captured by the lower-level construct, and therefore allows the detection of aggregate-level relationships not apparent at the individual level (Bliese, 2000). This form of emergence is identified as composition by some (Bliese), and compilation by others (Rousseau, 1985), illustrating its transitional nature. Fuzzy emergent constructs in the model tested include RN dichotomous ratings of intent to stay on the unit, as well as work context indicators of RNs having enough time with patients, enough time to document, working ≤ 12 hours last shift, taking a meal break, or not floating off their home unit (see Table 12, p. 106).

The RN Workgroup Intent to Stay Model is unique in viewing RN workgroup intent to stay as an emergent, group-level construct. As a fuzzy emergent construct, intent to stay includes higher-level contextual influences and unique individual contributions. Individual RN intent to stay is thought to be influenced by workgroup consensus on job satisfaction. In addition, workgroup turnover also can affect intent to stay in a snowball fashion (Krausz, Yaakovovitz, Bizman & Caspi, 1999). Individual RN intent to stay is thought to be influenced by uniquely personal influences including such factors as age, education, unit tenure, professional goals,

and family responsibilities. Interactions with dyads and networks both within and outside the unit may uniquely influence job plans of individual RNs as well.

Compilation emergence. In compilation emergence, individual level origins are different from the aggregate-level construct. In compilation emergence by variance, the focus of the construct shifts from the content of the phenomena to the variance of individual contributions (Kozlowski & Klein, 2000). Workgroup level diversity variables in the model, including age, unit tenure, education, and nursing certification, capture RN workgroup demographic diversity (see Table 12, p. 106). Other workgroup variance constructs, including shift worked and schedule rotation, reflect diversity in nursing unit work requirements. A number of researchers have examined the effect of variance indicators on workgroups (Bliese & Britt, 2001; Bliese & Halverson, 1998; Lau & Murnighan, 1998; Lindell & Brandt, 2000; Milliken & Martin, 1996).

Recap of Multilevel Approach

Specification of the multilevel RN Workgroup Intent to Stay Model began with the identification of the conceptual level and the level of origin of each model construct (see Table 12, p. 106). The model includes workgroup and hospital level global constructs, which are conceptualized and originate at the same level, and emergent constructs, which are conceptualized at the workgroup or hospital level, yet originate in the cognition, affect, behavior, or characteristics of individual RNs. Global constructs are objective, observable characteristics of single-level phenomena. In contrast, Kozlowski and Klein (2000) describe a nuanced continuum of processes

through which constructs emerge from individual RNs into workgroup or hospital phenomena. This continuum ranges from composition emergence, in which the higher-level construct is identical to its origin, to fuzzy emergence, in which the higher-level construct is both related to and different from its origin, to compilation emergence, in which the higher-level construct is different from its origin. Beginning with the identification of the conceptual level and the level of origin, specification of the multilevel RN Workgroup Intent to Stay Model continues with the alignment of the level of measurement and data used to represent each construct in analysis, which are described in Chapter III.

Summary

The purpose of this review was to synthesize reports of nursing turnover and job intention models, and refine a model for testing. Based on the findings of this review, I developed the RN Workgroup Intent to Stay Model (Figure 1, p. 2). Using a multilevel approach to model specification, each model construct was classified as either a global or an emergent construct, and further, emergent constructs were fit along a continuum of emergent processes. In this way, the level of measurement and the conceptual level of each model construct was identified and aligned. The study was the first to examine the validity of intent to stay as a workgroup level phenomenon, or to include measures of RN workgroup diversity. In Chapter III, I will describe the methodology used to test the model with medical unit RN workgroups.

Table 1
Nursing Job Intention and Turnover Models Reviewed

Investigators	Theoretical Focus	Outcome
Early Models		
Sheridan and Vredenburg, 1979	Effect of leadership	Hospital turnover
Weisman, Alexander, and Chase, 1981	Comprehensive model	Hospital turnover
Price and Mueller Model and Extensions		
Price and Mueller, 1981	Comprehensive model	Hospital turnover
Curry et al., 1985	Replicate Price and Mueller Model	Hospital turnover
Mueller and Price, 1990	Effect of moral dimension	Hospital turnover
Cavanagh and Coffin, 1992	Replicate Price and Mueller Model	Hospital retention
Gurney et al., 1997	Doctoral nurse model	Intent to leave institution
Anticipated Turnover Model		
Hinshaw and Atwood, 1983-1985	Extend Price and Mueller Model	Hospital turnover
Lucas, Atwood, and Hagaman, 1993	Replicate Anticipated Turnover Model	Hospital turnover
Leveck and Jones, 1996	Effect of nurse manager	Unit retention
Organizational Dynamics Paradigm Model		
Taunton, Boyle, Woods, Hansen, and Bott, 1997	Extend Anticipated Turnover Model	Unit retention
Bott, Boyle, Woods, and Taunton, 1993	Medical-surgical, critical care, operating room/recovery room, and obstetric/gynecology nurse models	Intent to stay on unit
Boyle, Bott, Hansen, Woods, and Taunton, 1999	Critical care nurse model	Intent to stay on unit

Table 1 continued
Nursing Job Intention and Turnover Models Reviewed

Investigators	Theoretical Focus	Outcome
Other Models		
Decker, 1985	Effect of socialization	Intent to leave hospital
Parasuraman, 1989	Comprehensive model	Hospital turnover
Hom and Griffith, 1991	Replicate Mobley Model	Hospital retention
Alexander, Lichtenstein, Oh, and Ullman, 1998	Psychiatric nurse model	Unit turnover
Lum, Kervin, Clark, Reid, and Sirola, 1998	Effect of pay satisfaction in pediatric RNs	Intent to leave hospital
Lake, 1998	Effect of burnout and clinical autonomy	Intent to leave position
Cox, 2001	Effect of Unit Conflict	Unit resignation
		Intent to leave hospital

Table 2
Samples in Literature Reviewed

Investigators	No. Hospitals ¹		No. Units ²		No. Nurses ³		Nurse Sample Frame	Response Rate
Sheridan & Vredenburgh (1979)	1				209		Staff RNs, LPNs, and aides	77%
Weisman et al. (1981)	2				1259		Full-time staff RNs	98%
Price & Mueller (1981)	7				1101		Full & part-time staff RNs	80%
	7		63 ²		781		Subsample: Units with > 4 respondents	
Curry et al. (1985)	5				841		Full & part-time supervisor and staff RNs, LPNs, and clerical staff in general medical and surgical units, excluded specialized unit	71%
Mueller & Price (1990)	1				135		Full-time staff RNs hired	NR ⁴
	7				221		June 1983 – October 1984	81% ⁵
Cavanagh & Coffin (1992)							Full-time supervisor and staff RNs with history of turnover	20% ⁶
Gurney et al., 1997	NA ⁷				842		Members of Sigma Theta Tau ⁸ with a PhD, stratified by health service setting (100%), or academic setting (25%)	82%

Table 2 continued
Samples in Literature Reviewed

Investigators	No. Hospitals ¹	No. Units ²	No. Nurses ³	Nurse Sample Frame	Response Rate
Hinshaw et al. (1987)	15		1597	Full-time staff RNs, LPNs, aides in rural hospitals, stratified by clinical service in urban hospitals ⁹	82%
	15		261	Subsample: BSN RNs	
	15		226	Subsample: Diploma RNs	
	15		238	Subsample: Medical-surgical RNs	
	15		176	Subsample: Critical Care RNs	
Lucas et al. (1993)	15		625	Subsample: Urban RNs	61%
	4		385	Full-time staff RNs	
Leveck & Jones (1996)	4		358	Full-time staff RNs	59%
	4	50 ²	248	on units with >4 responses and >33% response rate	
Taunton et al. (1997)	4			Subsample: equal numbers of stayer and leaver RNs	
Bott et al. (1993)	4		1171	Taunton et al.'s full sample: Full & part-time staff RNs	67%
	4		292	employed on eligible nurse manager's unit ⁷	
	4		256	Subsample: Medical-surgical RNs	
	4		172	Subsample: Critical Care RNs	
	4		125	Subsample: Operating and Recovery Room RNs	
	4			Subsample: Obstetrics and Gynecology RNs	

Table 2 continued
Samples in Literature Reviewed

Investigators	No. Hospitals ¹	No. Units ²	No. Nurses ³	Nurse Sample Frame	Response Rate
Boyle et al. (1999)	4		255	Subsample: Critical Care RNs	63%
Decker (1985)	1		483	Full and part-time staff nurses	80%
Parasuraman (1989)	1		307	Full-time staff RNs, LPNs, and supervisors	44%
Hom & Griffith (1991)	1		244	Random sample of full and part-time staff nurses	79%
Alexander et al. (1998)				Full-time direct care RNs, LPNs, aides on all units with >50% patients with psychosis diagnosis and cumulative length of stay of 150 days	
	29		1106	or >4 admissions to psychiatric unit in last year	97%
Lum et al. (1998)	1		361	Full and part-time staff RNs in NICU and PICU, one in four randomly selected from remaining units.	78%
Lake (1998)	20		680	RNs on dedicated AIDS units (20%) and general medical units (80%)	86%
Cox, K. (2001)	1		151	Staff RNs	49%

¹Number of hospitals

²Number of units, provided for unit level analysis only

³Number of nurse respondents

⁴Not reported

⁵Not for profit hospitals

⁶For profit hospitals

⁷Not applicable

⁸International Honor Society of Nursing Scholarship

⁹Overall sample, not used for analysis

Table 3
Sources of Job Satisfaction Items in Literature Reviewed

Source Instruments	Number of items	Models
General Job Satisfaction		
Index of Job Satisfaction (Brayfield & Rothe, 1951)	6-8	Price and Mueller Model (Cavanagh & Coffin, 1992; Curry et al., 1985; Gurney et al., 1997; Price & Mueller, 1981)
	23	Anticipated Turnover Model (Hinshaw et al., 1987; Leveck & Jones, 1996; Lucas et al., 1993)
	NR ¹	Organizational Dynamics Paradigm Model (Bott et al., 1993; Boyle et al., 1999; Taunton et al., 1997)
	18	Mueller & Price, 1990
Index of Job Satisfaction (Brayfield & Rothe, 1951)	5	Decker, 1985
Job satisfaction items (Hackman & Lawler, 1971)		
Minnesota Satisfaction Questionnaire (Vocational Psychology Research, University of Minnesota, 1977)		
Job satisfaction items (Hoppock, 1935)	4	Parasuraman, 1989
Female Faces Scale (Dunham & Herman, 1975)	NR ¹	Hom & Griffeth, 1991
Satisfaction with Job Dimensions		
Job Descriptive Index (Smith, Kendall & Hulin, 1969)	72	Weisman et al., 1981
Dimensions include work content, pay, promotional opportunity, supervision, and co-worker.		

Table 3 continued
Sources of Job Satisfaction Items in Literature Reviewed

Source Instruments	Number of items	Models
Satisfaction with Nursing Job Dimensions		
Index of Work Satisfaction (Slavitt, Stamps, Piedmont, & Haase, 1978). Dimensions include pay, nursing administration style, professional status, interaction with colleagues, and task.	32	Anticipated Turnover Model (Hinshaw et al., 1987; Leveck & Jones, 1996; Lucas et al, 1993)
Nursing Work Index (Kramer & Hafner, 1989). Dimensions not reported	25	Lum et al., 1998
Composite rating of 40 job aspects	NR ¹	Hom & Griffith, 1991
Adapted items from a number of instruments to measure several nursing job dimensions	38	Alexander et al., 1998
Satisfaction with Pay		
Based on Minnesota Satisfaction Questionnaire (Vocational Psychology Research, University of Minnesota, 1977)	4	Lum et al., 1998
Index of Work Satisfaction (Slavitt, Stamps, Piedmont, & Haase, 1978).		Cox, 2001

¹Not reported

Table 4
Description of Job Intention Variables in Literature Reviewed

Investigators	Number of items	Variable definition or example of items
Intent to stay		
Price & Mueller, 1981	2	Do you expect to leave the hospital in the near future?
Mueller & Price, 1990	5	Nurse's beliefs about how long they plan to stay with the hospital based on Price & Mueller, 1981
Cavanagh & Coffin, 1992	NR ¹	Intent to remain with the hospital & unit
Taunton et al., 1997; Bott et al., 1993; Boyle et al., 1999	NR ¹	
Intent to leave		
Weisman et al., 1981	1	Number of times seriously looked for another nursing job since working at the hospital
Curry et al., 1985	1	Do you expect to leave hospital voluntarily in near future?
Parasuraman, 1989	1	Given your present feelings about your job, how likely is it that you will resign and leave your job in the next 6 months?
Gurney et al., 1997	NR ¹	based on Price & Mueller, 1986
Lake, 1998	1	Do you have plans to leave your present nursing position?
Intent to quit		
Alexander et al., 1998	3	There is a good chance that I will leave this job in the next year or so.
Anticipated turnover		
Cox, 2001; Hinshaw et al., 1987; Lucas et al., 1993	12	Degree to which nurse perceived they would terminate their position

Table 4 continued
Description of Job Intention Variables in Literature Reviewed

Investigators	Number of items	Variable definition or example of items
Propensity to leave Decker, 1985	3	I will probably quit my job at this hospital within the next 2 years.
Turnover intent Lum et al., 1998	3	In the last few months have you ever thought seriously about looking for a nursing job in another hospital?
Withdrawal cognition Hom & Griffith, 1991	6	Thoughts of quitting, intentions to quit, search intentions

¹Not reported

Table 5
Operational Definitions of Turnover Variable in Literature Reviewed

Investigators	Variable	Operational Definition	Months measured	Sample Turnover rate
Sheridan & Vredenburg, 1979	Hospital turnover	Terminated voluntarily from hospital, excluded retirement, dismissal, leave of absence for medical or educational reasons.	12	19%
Weisman et al., 1981	Hospital turnover	Terminated voluntarily from hospital, excluded death, retirement, dismissal, physical disability, promotion or demotion out of staff role, leave of absence.	12	22-30%
Price & Mueller, 1981	Hospital turnover	Terminated voluntarily from hospital, included terminations due to family responsibilities, excluded death, retirement, dismissal, serious physical disability.	14	19%
Mueller & Price, 1990	Hospital turnover	Terminated voluntarily from hospital.	12	7%
Curry et al., 1985	Hospital turnover	Terminated voluntarily from hospital, excluded all other terminations.	18	16%
Cavanagh & Coffin, 1992	Hospital retention	Self-reported months of employment in hospital	NR ¹	NR ¹
Hinshaw et al., 1987	Hospital turnover	Terminated voluntarily from hospital.	12	16%
Lucas et al., 1993	Hospital turnover	Terminated voluntarily from hospital.	12	32%
Leveck & Jones, 1996	Unit retention	Retained on unit.	12	NR ^{1,2}

Table 5 continued
Operational Definitions of Turnover Variable in Literature Reviewed

Investigators	Variable	Operational Definition	Months measured	Sample Turnover rate
Taunton et al., 1997	Unit retention	Proportion of study period nurses remained on unit.	6	11%
Parasuraman, 1989	Hospital turnover	Terminated voluntarily from hospital.	6	
Lake, 1998	Unit resignation	Resigned from unit.	12	11%
Alexander et al., 1998	Unit turnover	Resigned or transferred from unit, excluded dismissal, retirement, illness, death, temporary transfers of 6 months or less.	13-22	10%
Hom & Griffith, 1991	Hospital retention	Retained in hospital.	18	35%
Not reported			6	11%

¹Not reported

²Reported average unit retention rate of 67%

Table 6
 Variance in Job Satisfaction, Commitment, Job Intention, and Turnover Explained by Models Reviewed

Author	Analysis ¹	General Job Satisfaction		Job Dimensions Satisfaction		Commitment		Job Intention		Turnover	
		R ² /Adj R ²	R ² /Adj R ²	R ² /Adj R ²	R ² /Adj R ²	R ² /Adj R ²	R ² /Adj R ²	R ² /Adj R ²	R ² /Adj R ²	R ² /Adj R ²	R ² /Adj R ²
Sheridan & Vredenburg, 1979 ²		--	--	--	--	--	--	--	--	--	.08/--
Weisman et al., 1981 ²		--	.44/--			--		.22/--			.08/--
Weisman et al., 1981 ²	Hospital B Individual	--	.42/--			--		.22/--			.10/--
Price & Mueller, 1981 ³		.27/.26	--			--		.20/.19			.18/.17
Price & Mueller, 1981 ³	Unit level	.65/.57	--			--		.37/.20			.42/.26
Curry et al., 1985 ³		.43/.42	--			.43/.41		.32/.30			.15/.13
Mueller & Price, 1990 ²		.54/.46	--			.50/.41		.43/.32			Logistic Reg
Cavanagh & Coffin, 1992 ²		NR	--			--		NR			NR
Gurney et al., 1997 ⁴		.56	--			.50		.56			--
Hinshaw Report	Total sample	.43	.54					.27			.06
Hinshaw et al., 1987 ²	BA ⁵	.49/--	.57/--			--		.20/--			.02/--
Hinshaw et al., 1987 ²	Diploma ⁶	.38/--	.50/--			--		.16/--			.06/--
Hinshaw et al., 1987 ²	CC ⁷	.40/--	.56/--			--		.31/--			ns
Hinshaw et al., 1987 ²	MS ⁸	.40/--	.58/--			--		.21/--			.06/--
Lucas et al., 1993 ²		--/.50	--/.46			--		--/.32			--/.29
Lucas et al., 1993 ²	Hinshaw's Urban RNs ⁹	--/.41	--/.41			--		--/.25			--/.21
Leveck & Jones, 1996 ²	Unit level	--/.72	--/.69			--		--			--/.49
Taunton et al., 1997 ³	Stayers & Leavers	.54/.51	--			.43/.37		.45/.40			.22/.14
Bott et al., 1993 ³	Taunton's total sample	.39/--	--			.41/--		.39/.38			--

Table 6 continued
 Variance in Job Satisfaction, Commitment, Job Intention, and Turnover Explained by Models Reviewed

Author	Analysis ¹	General Job Satisfaction		Job Dimensions Satisfaction		Commitment		Job Intention		Turnover	
		R ² /Adj R ²	Sig	R ² /Adj R ²	Sig	R ² /Adj R ²	Sig	R ² /Adj R ²	Sig	R ² /Adj R ²	Sig
Bott et al., 1993 ³	MS ⁸	.39/.35	Sig	--	--	.29/.26	Sig	--	.29/.26	--	--
Bott et al., 1993 ³	CC ⁷	.51/--	Sig	--	--	.45/.41	ns	--	.45/.41	--	--
Bott et al., 1993 ³	OR/RR ¹⁰	.35/.34	Sig	--	--	.48/.43	Sig	--	.48/.43	--	--
Bott et al., 1993 ³	OB/GYN ¹¹	--	Sig	--	--	.42/.37	Sig	--	.42/.37	--	--
Boyle et al., 1999 ³	CC ⁷	--	.39/.35	--	--	.45/.41	ns	--	.45/.41	--	--
Decker, 1985 ²		--	.51/--	--	--	.45/--	--	--	.45/--	--	--
Parasuraman, 1989 ²		--	.35/.34	--	--	.36/.34	.34/.33	--	.36/.34	--	.06/.05
Hom & Griffith, 1991 ²		--	--	--	--	--	--	--	--	--	NR
Alexander et al., 1998 ²		--	--	--	--	--	--	--	.31	--	.17
Lum et al., 1998 ²		--	--	NR	NR	NR	NR	NR	NR	NR	--
Lake, 1998 ²		--	--	--	--	.112 ¹²	--	--	.112 ¹²	--	.12/--
Cox, 2001 ²		--	--	--	--	.37	--	--	.37	--	--

¹Results presented for total sample, individual level analysis unless sub-sample or unit level analysis indicated

²No correlates or controls in model

³Results prior to adding correlates or controls

⁴Results reported with controls in model only

⁵Sub-sample of nurses with BA degree

⁶Subsample of nurses with diploma

⁷Subsample of critical care nurses

⁸Subsample of medical-surgical nurses

⁹Subsample of urban nurses from Hinshaw et al. (1987)

¹⁰Subsample of operating room, recovery room nurses

¹¹Subsample of obstetric, gynecology nurses

¹²Ordered logit χ^2

Table 7
Direct Effects of Environmental, Hospital, and Nursing Unit Exogenous Variables on Stress, Satisfaction, Commitment, Intention and Turnover in Literature Reviewed

Variables	Author	Path Coefficients			
		Stress ¹	Satisfaction ²	Commitment	Intention Turnover
Environmental Factors					
Job opportunity	Price & Mueller, 1981		-.07		-.11
Job opportunity	Curry et al., 1985			-.08	.12
Job opportunity	Mueller & Price, 1990		-.15	-.18	-.18
Job opportunity	Cavanagh & Coffin, 1992		-.15		-.07
Job opportunity	Taunton et al., 1997	.22 ⁶	-.11 ⁶	-.13 ⁶	-.13 ⁶
Job opportunity	Bott et al., 1993 (Taunton et al's full sample)	.17 ⁶	-.12 ⁶	-.14 ⁶	-.13 ⁶
Job opportunity	Bott et al., 1993 (all subsamples)				nr ⁴
Less job opportunity	Boyle et al., 1999				.04 ⁶
Local opportunities	Gurney et al., 1997				
Non-local opportunities	Gurney et al., 1997		-.09		.22
Hire wait list	Mueller & Price, 1990				
Hospital RN vacancy rate	Lake, 1998				.014 ⁵
Hospital Factors					
Annual job income	Price & Mueller, 1981				.11
Annual job income	Curry et al., 1985		-.10		-.13
Annual job income	Mueller & Price, 1990		-.30	-.14	

Table 7 continued
 Direct Effects of Environmental, Hospital, and Nursing Unit Exogenous Variables on Stress, Satisfaction, Commitment, Intention, and Turnover in Literature Reviewed

Variables	Author	Path Coefficients		
		Stress ¹	Satisfaction ²	Commitment Intention Turnover
Hospital Factors continued				
Annual job income	Cavanagh & Coffin, 1992			.09
Annual job income	Gurney et al., 1997		-.08	
Satisfaction with pay	Lum et al., 1998		.39	-.21
Urban location ³	Hinshaw & Atwood, 1983-1985			.06
Urban location ³	Hinshaw et al., 1987 (BA and Diploma subsamples)		.10	
Urban location ³	Hinshaw et al., 1987 (MS subsample)		-.16	-.13
Academic setting ³	Gurney et al., 1997		-.06	
Large size ³	Gurney et al., 1997			-.05
Nursing Unit Factors				
Nurse-to-patient ratio	Weisman et al., 1981		.13	-.09
Nurse-to-patient ratio	Lake, 1998			-.16
% unit RNs with BA	Weisman et al., 1981		.07	
% unit RNs new graduate nurses	Weisman et al., 1981			-.11

Table 7 continued
 Direct Effects of Environmental, Hospital, and Nursing Unit Exogenous Variables on Stress, Satisfaction, Commitment, Intention, and Turnover in Literature Reviewed

Variables	Author	Path Coefficients			
		Stress ¹	Satisfaction ²	Commitment	Intention Turnover
Nursing Unit Factors continued					
% unit staff new graduate nurses ⁶	Taunton et al., 1997				-.17 ⁶
% unit staff RNs ³	Taunton et al., 1997				.10 ⁶
Work unit size	Curry et al., 1985			.10	
Recent change in supervisor ³	Curry et al., 1985				nr
Critical Care ³	Hinshaw & Atwood, 1983-1985		.14		.07
Critical Care ³	Hinshaw et al., 1987 (BA subsample)		.12		
Critical Care ³	Lucas et al., 1993	.14			
Medical-Surgical ³	Lucas et al., 1993 (Hinshaw's urban RN subsample)	.11	-.16		
Medical-surgical ³	Lucas et al., 1993	.33	-.21		
Medical-surgical ³	Leveck & Jones, 1996	.23	-.33		
Obstetrics ³	Hinshaw & Atwood, 1983-1985		.15		
Obstetrics ³	Hinshaw et al. (diploma subsample)		.20		

Table 7 continued
 Direct Effects of Environmental and Organizational Exogenous Variables on Stress, Satisfaction, Commitment, Intention, and Turnover in Literature Reviewed

Variables	Author	Path Coefficients		
		Stress ¹	Satisfaction ²	Commitment Intention Turnover
Nursing Unit Factors continued				
Pediatrics, psychiatry, other ³	Hinshaw & Atwood, 1983-1985			.14
Not Critical Care ³	Hinshaw et al. (BA subsample)			.17
Not Obstetrics ³	Hinshaw et al. (diploma subsample)			.23
Unit Nurse Manager Leadership Factors				
Responsiveness	Weisman et al., 1981		.20	
Relationship	Decker, 1985		.13	
Management style	Leveck & Jones, 1996		.46	
Position Power	Bott et al., 1993 (critical care subsample)	-.67		nr ⁴
Position Power	Boyle et al., 1999			.11 ⁶
Work Coordination	Bott et al., 1993 (critical care subsample)			nr ⁴
Work Coordination	Boyle et al., 1999	-.14 ⁶	.12 ⁶	.11 ⁶
Structure expectations	Taunton et al., 1997	-.20 ⁶	.12 ⁶	.11 ⁶
Structure expectations	Bott et al., 1993 (medical-surgical & critical care subsample)			nr ⁴

Table 7 continued
 Direct Effects of Environmental, Hospital, and Nursing Unit Exogenous Variables on Stress, Satisfaction, Commitment, Intention, and Turnover in Literature Reviewed

Variables	Author	Path Coefficients		
		Stress ¹	Variables	Author
Consideration	Taunton et al., 1997			Stress ¹
Consideration	Bott et al., 1993 (Taunton full sample)	.10 ⁶		.20 ⁶
Consideration	Bott et al., 1993 (all subsamples)			
Supervisory support	Gurney et al., 1997		.07	m ⁴
Mentor support	Gurney et al., 1997		.09	
Leadership attention	Parasuraman, 1989		.18	

¹Includes all stress scales

²Includes all satisfaction scales

³Control variable

⁴Significant, path coefficient value not reported

⁵Logit

⁶Semi-partial correlations

Table 8
Direct Effects of Individual Exogenous Variables on Stress, Satisfaction, Commitment, Intention, and Turnover in Literature Reviewed

Variables	Author	Path Coefficients			
		Stress ¹	Satisfaction ²	Commitment	Intention Turnover
Individual Nurse Factors: Personal					
Age ³	Price & Mueller, 1981		.12		
Age ³	Price & Mueller, 1981 (unit level)		.24	.27	nr ⁴
Age ³	Curry et al., 1985			nr ⁴	nr ⁴
Age ³	Lucas et al., 1993			-.18	
Age ³	Lucas et al., 1993 (Hinshaw's urban RN sample)		.15	-.19	
Age	Parasuraman, 1989				.15
Age	Alexander et al., 1998	-.19			-.20
Age	Cox, 2001			-.36	
Gender	Alexander et al., 1998			-.15	
Marital Status	Hinshaw et al., 1987 (diploma subsample)				.15
Kinship Responsibility	Price & Mueller, 1981		.06	.17	
Kinship Responsibility	Price & Mueller, 1981 (unit level)			.33	
Kinship Responsibility	Curry et al., 1985		.11	-.14	
Kinship Responsibility	Cavanagh & Coffin, 1992		.08	.12	
Young child at home ³	Lum et al., 1998			-.27	
Young children at home	Lake, 1998			-.54 ⁵	-.09
Internal Locus of Control	Weisman et al., 1981		.13		
Positive affectivity ³	Gurney et al., 1997		.21		
Negative affectivity ³	Gurney et al., 1997		-.10		

Table 8 continued
 Direct Effects of Individual Exogenous Variables on Stress, Satisfaction, Commitment, Intention, and Turnover in Literature Reviewed

Variables	Author	Path Coefficients			
		Stress ¹	Satisfaction ²	Commitment	Intention Turnover
Individual Nurse Factors: Work related					
Nursing tenure	Hinshaw & Atwood, 1983-1985			.09	-.10
Nursing tenure ³	Decker, 1985				-.17
Nursing tenure ³	Gurney et al., 1997				-.14
Hospital tenure	Sheridan & Vredenburgh, 1979				-.20
Hospital tenure	Weisman et al., 1981				-.17
Hospital tenure ³	Price & Mueller, 1981			.26	.45
Hospital tenure ³	Price & Mueller, 1981 (unit level)				
Hospital tenure	Hinshaw et al., 1987 (BA subsample)		NR ⁴		
Hospital tenure	Hinshaw et al., 1987 (medical-surgical subsample)		-.15		
Hospital tenure ³	Lucas et al., 1993	-.22			
Hospital tenure ³	Lucas et al., 1993 (Hinshaw's urban RN subsample)	-.17			
Hospital tenure	Lake, 1998				-.09 ⁵
Facility tenure ³	Gurney et al., 1997				.23
Facility tenure squared ³	Gurney et al., 1997				-.47
Unit tenure ³	Leveck & Jones, 1996				.20
Position tenure ³	Taunton et al., 1997				.14 ⁶
Recent turnover ³	Curry et al., 1985			nr ⁴	nr ⁴
Initial expectations of hospital tenure	Hinshaw & Atwood, 1983-1985				.10

Table 8 continued
 Direct Effects of Individual Exogenous Variables on Stress, Satisfaction, Commitment, Intention, and Turnover in Literature Reviewed

Variables	Author	Path Coefficients			
		Stress ¹	Satisfaction ²	Commitment	Intention Turnover
Initial expectations of hospital tenure	Hinshaw et al., 1987 (BA subsample)				.14
Initial expectations of hospital tenure	Hinshaw et al., 1987 (critical care & medical-surgical subsamples)				.12 - .14
Tenure expectation > 5 year ³	Boyle et al., 1999				.11 ⁶
Tenure expectation < 2 year ³	Boyle et al., 1999				-.10 ⁶
LPN position ³	Hinshaw & Atwood, 1983-1985	.15			-.06
RN position ³	Hinshaw et al., 1987 (critical care subsample)	.21			
Position level	Weisman et al., 1981	-.21			.12
Job level	Parasuraman, 1989			.13	
New graduate position	Weisman et al., 1981				.12
Education	Price & Mueller, 1981				-.20
Education	Price & Mueller, 1981 (unit level)		.20		-.29
Education	Mueller & Price, 1990				-.19
Education	Cavanagh & Coffin, 1992				.15
BS	Hinshaw & Atwood, 1983-1985				.06
BS	Lucas et al., 1993				-.13
Education	Alexander et al., 1998				.10
Education	Decker et al., 1985				.14
Education ³	Lum et al., 1998				.20
Professionalism	Curry et al., 1985	.09	.11		.08
					-.07

Table 8 continued
 Direct Effects of Individual Exogenous Variables on Stress, Satisfaction, Commitment, Intention, and Turnover in Literature Reviewed

Variables	Author	Path Coefficients			
		Stress ¹	Satisfaction ²	Commitment	Intention Turnover
Work motivation ³	Gurney et al., 1997		.11		
Career orientation ³	Gurney et al., 1997		.08	.12	
Performance self-image ³	Gurney et al., 1997		.11		
Work motivation	Mueller & Price, 1990		.34	-.15	
Explicitness of job decision	Mueller & Price, 1990			.18	
Full/part time ³	Price & Mueller, 1981		.11		
12 hour shift ³	Lum et al., 1998				-.13
Rotate shift ³	Lucas et al., 1993	.15			
Night shift ³	Hinshaw & Atwood, 1983-1985		.10		
Evening shift ³	Hinshaw et al., 1987 (critical care subsample)		.18		
Night shift ³	Lucas et al., 1993 (Hinshaw's urban RN subsample)		.09		

¹Includes all stress scales

²Includes all satisfaction scales

³Control variable

⁴Significant, path coefficient value not reported

⁵Logit

⁶Semi-partial correlation

Table 9
Direct Effects of Exogenous Variables on Perceptions of the Nursing Work Environment in Literature Reviewed

Variables	Author	Path Coefficients				Unit morale & interpersonal relations
		Autonomy	Routinization	Group Cohesion	Instrumental Communication	
Environmental Factors						
Opportunity elsewhere	Taunton et al., 1997			-.13 ¹		
Opportunity elsewhere	Bott et al., 1993 (Taunton et al.'s full sample)			-.13 ¹		
Nursing Unit Factors						
Beds per unit	Cox, 2001					.29
% RNs	Cox, 2001					.32
Nursing Unit Manager Factors						
Nurse Manager Responsiveness	Weisman et al., 1981	.30				
Position Power	Taunton et al., 1997		.15 ¹			
Position Power	Bott et al., 1993 (Taunton et al.'s full sample)	-.11 ¹				
Work Coordination	Taunton et al., 1997	.17 ¹				
Structuring expectations	Taunton et al., 1997				.26 ¹	

Table 9 continued
 Direct Effects of Exogenous Variables on Perceptions of the Nursing Work Environment in Literature Reviewed

Variables	Author	Path Coefficients					Unit morale & interpersonal relations
		Autonomy	Routinization	Group Cohesion	Instrumental Communication		
Nursing Unit Manager Factors continued							
Structuring expectations	Bott et al., 1993 (Taunton et al.'s full sample)			.10 ¹	.15 ¹		
Structuring expectations	Boyle et al., 1999				.24 ¹		
Consideration	Taunton et al., 1997			.17 ¹			
Consideration	Bott et al., 1993 (Taunton et al.'s full sample)	.22 ¹		.16 ¹			
Consideration	Boyle et al., 1999	.17 ¹		.22 ¹			
Leadership Attention	Parasuraman, 1989	-.14					
Individual Nurse Factors: Personal							
Internal Locus of Control	Weisman et al., 1981	.08					
Individual Nurse Factors: Work related							
Hospital Tenure (job experience)	Weisman et al., 1981	.08					
Hospital Experience ¹	Lucas et al., 1993					-.13	
Rotating shift	Weisman et al., 1981	-.14					

Table 9 continued
 Direct Effects of Exogenous Variables on Perceptions of the Nursing Work Environment in Literature Reviewed

Variables	Author	Path Coefficients					Unit morale & interpersonal relations
		Autonomy	Routinization	Group Cohesion	Instrumental Communication		
Nurse Perceptions of Work Environment							
Control over practice	Taunton et al., 1997				.19 ¹		
Control over practice	Bott et al., 1993 (Taunton et al.'s full sample)		-.14 ¹		.11 ¹		
Control over practice	Taunton et al., 1997			.13 ¹	.15 ¹		
Control over practice	Bott et al., 1993 (Taunton et al.'s full sample)	.12 ¹			.16 ¹		
Professional time adequacy	Weisman et al., 1981	-.12					

¹Semi-partial correlation

Table 10
Direct Effects of Perceptions of the Nursing Work Environment on Stress, Satisfaction, Commitment, Intention, and Turnover
in Literature Reviewed

Variables	Author	Path coefficients			
		Stress ¹	Satisfaction ²	Commitment	Intention Turnover
Intrinsic job satisfactions	Decker, 1985		.37		
Motivating potential	Parasuraman, 1989		.24	.16	
Autonomy	Weisman et al., 1981		.30		
Participation	Price & Mueller, 1981		.12		
Participation	Price & Mueller, 1981 (unit level)		.24		
Centralization	Curry et al., 1985		-.20		
Participation	Cavanagh & Coffin, 1992		.25		
Autonomy	Gurney et al., 1997				-.15
Autonomy as quality of employment	Hinshaw & Atwood, 1983-1985		.12-.14		
Autonomy as quality of employment	Hinshaw & Atwood, 1983-1985 (BA & Diploma subsamples)		.13-.18		
Autonomy as quality of employment	Hinshaw & Atwood, 1983-1985 (medical-surgical subsample)		.15		
Autonomy as job characteristic	Hinshaw & Atwood, 1983-1985		-.08		
Autonomy	Taunton et al., 1997	-.23 ⁵	.10 ⁵		
Autonomy	Bott et al., 1993 (Taunton et al.'s full sample)	-.21 ⁵			
Autonomy	Boyle et al., 1999	-.15 ⁵ to -.18 ⁵			

Table 10 continued
 Direct Effects of Perceptions of the Nursing Work Environment on Stress, Satisfaction, Commitment, Intention, and Turnover
 in Literature Reviewed

Variables	Author	Path Coefficients		
		Stress ¹	Satisfaction ²	Commitment Intention Turnover
Autonomy	Bott et al., 1993 (medical-surgical, critical care, & operating room subsamples)			nr ³
Autonomy	Alexander et al., 1998			-.14
Clinical Autonomy	Lake, 1998			1.14 ⁴
Autonomy	Gurney et al., 1997			-.15
Control over practice	Hinshaw & Atwood, 1983-1985	.07-.14		
Control over practice	Hinshaw & Atwood, 1983-1985 (BA & Diploma subsamples)	.17-.23		
Control over practice	Hinshaw & Atwood, 1983-1985 (critical care & medical-surgical subsamples)	.16		
Control over practice	Taunton et al., 1997	.13 ⁵		
Control over practice	Bott et al., 1993 (Taunton et al.'s full sample)	.19 ⁵		
Control over practice	Bott et al., 1993 (critical care & operating room subsamples)			nr ³
MD relations: task delegation	Weisman et al., 1981	-.15		
Routinization	Price & Mueller, 1981	-.30		
Routinization	Price & Mueller, 1981 (unit level)	-.46		.23
Routinization	Curry et al., 1985	-.29		

Table 10 continued
 Direct Effects of Perceptions of the Nursing Work Environment on Stress, Satisfaction, Commitment, Intention, and Turnover
 in Literature Reviewed

Variables	Author	Path Coefficients			
		Stress ¹	Satisfaction ²	Commitment	Intention Turnover
Routinization	Price & Mueller, 1981 (unit level)		-.46		.23
Routinization	Curry et al., 1985		-.29		
Routinization	Mueller & Price, 1990				.17
Task identity	Mueller & Price, 1990		.16		
Routinization	Cavanagh & Coffin, 1992		.24		
Variety	Gurney et al., 1997		.29		
Routinization	Taunton et al., 1997		-.13 ⁵		
Routinization	Bott et al., 1993 (Taunton et al.'s full sample)		-.14 ⁵		
Routinization	Bott et al., 1993 (operating room & obstetric subsamples)				nr ³
Integration	Price & Mueller, 1981 (unit level)		-.25		
Integration	Curry et al., 1985		.09		.09
Integration	Mueller & Price, 1990		.29		
Work-group cohesion	Gurney et al., 1997		.08		
Group cohesion	Hinshaw & Atwood, 1983-1985		.14-.30		-.11
Group cohesion	Hinshaw et al., 1987 (BA & Diploma subsamples)		.17-.27		-.18
Group cohesion	Hinshaw et al., 1987 (Critical care & medical-surgical subsamples)		.22-.39		-.13 to -.14

Table 10 continued
 Direct Effects of Perceptions of the Nursing Work Environment on Stress, Satisfaction, Commitment, Intention, and Turnover
 in Literature Reviewed

Variables	Author	Path Coefficients			
		Stress ¹	Satisfaction ²	Commitment	Intention Turnover m ³
Instrumental communication	Bott et al., 1993 (critical care, operating room, & obstetric subsamples)				
Instrumental communication	Boyle et al., 1999	-.24 ⁵			
Role clarity	Alexander et al., 1998				-.11
Role Overload	Curry et al., 1985		.11		
Role overload	Gurney et al., 1997			.16	
Work load	Alexander et al., 1998				-.13
Work overload	Parasuraman, 1989	.37			
Work hazards	Alexander et al., 1998				-.10
Role Conflict	Parasuraman, 1989	.30	-.20	-.20	-.08
Moral/professional conflict	Decker, 1985		-.15		
Resource Adequacy	Price & Mueller, 1981 (unit level)		.09	.14	
Distributive justice	Curry et al., 1985		.27		
Distributive justice	Gurney et al., 1997		.15	.19	
Distributive justice	Taunton et al., 1997		.13 ⁵	.16	
Distributive justice	Bott et al., 1993 (Taunton et al.'s full sample)	-.18 ⁵	.13 ⁵		
Distributive justice	Bott et al., 1993 (all subsamples)	-.18 ⁵	.13 ⁵		

Table 10 continued
 Direct Effects of Perceptions of the Nursing Work Environment on Stress, Satisfaction, Commitment, Intention, and Turnover
 in Literature Reviewed

Variables	Author	Path Coefficients			
		Stress ¹	Satisfaction ²	Commitment	Intention Turnover
Promotional opportunity	Price & Mueller, 1981		.17		
Distributive justice	Taunton et al., 1997	-.18 ⁵	.13 ⁵		
Distributive justice	Bott et al., 1993 (Taunton et al.'s full sample)	-.18 ⁵	.13 ⁵		
Distributive justice	Bott et al., 1993 (all subsamples)				m ³
Promotional opportunity	Price & Mueller, 1981		.17		
Promotional opportunity	Curry et al., 1985		.15	.10	
Promotion	Cavanagh & Coffin, 1992		.16		
Promotional opportunity	Gurney et al., 1997		.11		-.29
Promotional opportunity	Taunton et al., 1997		.24 ⁵		
Promotional opportunity	Bott et al., 1993 (Taunton et al.'s full sample)		.21 ⁵		
Advancement (hospital)	Decker, 1985		.25		-.20 m ³
Promotional opportunity	Bott et al., 1993				.01 ⁵
Promotional opportunity	Boyle et al., 1999				
Professional growth	Alexander et al., 1998				-.21

Table 10 continued
 Direct Effects of Perceptions of the Nursing Work Environment on Stress, Satisfaction, Commitment, Intention, and Turnover
 in Literature Reviewed

Variables	Author	Path Coefficients			
		Stress ¹	Satisfaction ²	Commitment	Intention Turnover
Professional time adequacy	Weisman et al., 1981				-.16

¹Includes all stress scales

²Includes all satisfaction scales

³Significant, path coefficient value not reported

⁴Odds Ratio

⁵Semi-partial correlation

Table 11
Effects of Intervening Variables on Satisfaction, Commitment, Intention, and Turnover in Literature Reviewed

Variables	Author	Path Coefficients		
		Satisfaction ¹	Commitment	Intention
Stress	Hinshaw & Atwood, 1983-1985	-.30 to -.47		
Stress	Hinshaw et al., 1987 (BA & Diploma subscales)	-.29 to -.47		
Stress	Hinshaw et al., 1987 (medical-surgical & critical care subscales)	-.30 to -.48		-.25
Stress	Lucas et al., 1993	-.43 to -.57		
Stress	Lucas et al., 1993 (Hinshaw urban RN subsample)	-.37 to -.51		
Stress	Leveck & Jones, 1996	-.28 to -.41		
Stress	Parasuraman, 1989	-.25		
Situational stress	Taunton et al., 1997	-.14 ³ to -.28 ³		-.15 ³
Situational stress	Bott et al., 1993 (Taunton et al.'s full sample)	-.17 ³ to -.21 ³		
Situational stress	Boyle et al., 1999	-.12 ³		nr ²
Situational stress	Bott et al., 1993 (all subsamples)			
Personal stress	Taunton et al., 1997	-.16 ³		
Personal stress	Bott et al., 1993 (Taunton et al.'s full sample)	-.16 ³		

Table 11 continued
Effects of Intervening Variables on Satisfaction, Commitment, Intention, and Turnover in Literature Reviewed

Variables	Author	Path Coefficients		
		Satisfaction ¹	Commitment	Intention
Stress continued				Turnover
Personal stress	Bott et al., 1993 (critical care & operating room subsamples)			nr ²
Personal stress	Boyle et al., 1999			
Burnout	Lake, 1998	-.16 ³		.047 ³
Job Satisfaction				
Job Satisfaction	Weisman et al., 1981			-.30
Job Satisfaction	Price & Mueller, 1981			.28
Job Satisfaction	Price & Mueller, 1981 (unit level)			.36
Job Satisfaction	Curry et al., 1985		.40	-.35
Job Satisfaction	Mueller & Price, 1990		.40	
Job Satisfaction	Cavanagh & Coffin, 1992			.34
Job Satisfaction	Gurney et al., 1997		.41	
Job Satisfaction	Decker, 1985			-.47
Job Satisfaction	Parasuraman, 1989			-.27
Job Satisfaction	Hom & Griffeth, 1991			-.79
Job Satisfaction	Lum et al., 1998			
Job Satisfaction	Lake, 1998		.40	
Organizational and professional satisfaction	Hinshaw Report			-.005 ³
Organizational and professional satisfaction	Hinshaw et al., 1987 (BA & diploma subsamples)			-.20 to -.26
Organizational and professional satisfaction	Hinshaw et al., 1987 (medical-surgical & critical care subsamples)			-.16 to -.27
Organizational and professional satisfaction				-.23 to -.33

Table 11 continued
Effects of Intervening Variables on Satisfaction, Commitment, Intention, and Turnover in Literature Reviewed

Variables	Author	Path Coefficients			
		Satisfaction ¹	Commitment	Intention	Turnover
Job Satisfaction continued					
Organizational and professional satisfaction	Lucas et al., 1993 (Hinshaw et al.'s urban RN subsample)			-.20 to -.26	
Organizational and professional satisfaction	Lucas et al., 1993			-.26 to -.28	
Professional satisfaction	Leveck & Jones, 1996				.74
Job enjoyment & administrative satisfaction	Taunton et al., 1997		.19 ³ -.24 ³	.11 ³	
Job enjoyment & administrative satisfaction	Bott et al., 1993 (Taunton et al.'s full sample)		.22 ³ -.24 ³	.19 ³	
Job enjoyment	Bott et al., 1993 (all subsamples)			nr ²	
Job enjoyment	Boyle et al., 1999			.32 ³	
Dimensions of job satisfaction	Alexander et al., 1998			-.10 to -.21	
Unit morale & interpersonal relations	Cox, 2001			-.53	
Job commitment					
Job commitment	Curry et al., 1985			-.15	.08
Job commitment	Mueller & Price, 1990			.30	
Job commitment	Gurney et al., 1997			-.31	
Job commitment	Taunton et al., 1997			.24 ³	
Job commitment	Bott et al., 1993 (Taunton et al.'s full sample)			.23 ³	

Table 11 continued
 Effects of Intervening Variables on Satisfaction, Commitment, Intention, and Turnover in Literature Reviewed

Variables	Author	Path Coefficients		
		Satisfaction ¹	Commitment	Intention
Job commitment continued				
Job commitment	Bott et al., 1993 (medical-surgical, operating room, & obstetric subsamples)			nr ²
Job commitment	Parasuraman, 1989			-.26
Job commitment	Lum et al., 1998			-.31
Intention				
Intention to leave	Weisman et al., 1981			.12
Intention to leave	Curry et al., 1985			.38
Anticipated turnover	Hinshaw Report			.15
Anticipated turnover	Hinshaw et al., 1987 (BA subsample)			.15
Anticipated turnover	Hinshaw et al., 1987 (medical-surgical subsample)			.17
Anticipated turnover	Lucas et al., 1993 (Hinshaw et al.'s urban RN subsample)			.47
Anticipated turnover	Lucas et al., 1993			.53
Intention to leave (6 month)	Parasuraman, 1989			.22
Intention to leave (12 month)	Parasuraman, 1989			.14
Withdrawal cognitions	Hom & Griffith, 1991			-.40

Table 11 continued
Effects of Intervening Variables on Satisfaction, Commitment, Intention, and Turnover in Literature Reviewed

Variables	Author	Path Coefficients			
		Satisfaction ¹	Commitment	Intention	Turnover
Intention continued					
Intention to quit	Alexander et al., 1998				.23
Intention leave	Lake, 1998				.25
Intention to stay	Price & Mueller, 1981				-.37
Intention to stay	Price & Mueller, 1981 (unit level)				-.41
Intention to stay	Mueller & Price, 1990				-.32
Intention to stay	Cavanagh & Coffin, 1992				.16
Intention to stay	Taunton et al., 1997				.33 ³

¹Includes all satisfaction scales

²Significant, path coefficient value not reported

³Semi-partial correlation

Table 12
Type of Construct in RN Workgroup Intent to Stay Model

Construct	Level of origin	Conceptual level
Global Constructs		
Hospital Magnet designation	Hospital	Hospital
Hospital location in metropolitan area	Hospital	Hospital
Hospital size as number of beds	Hospital	Hospital
Hospital ownership	Hospital	Hospital
Hospital teaching status	Hospital	Hospital
Unit Type	RN workgroup	RN workgroup
Patient-to-RN ratio	RN workgroup	RN workgroup
% nursing hours by RNs	RN workgroup	RN workgroup
Emergent Constructs		
Composition Emergence by Direct Consensus		
Adequacy of RN orientation	Individual	RN workgroup
RN influence in scheduling	Individual	RN workgroup
Appropriate RN assignments	Individual	RN workgroup
Change in unit overtime needs	Individual	RN workgroup
Composition Emergence by Referent Shift Consensus ¹		
Satisfaction with nursing administration	Individual ¹	Hospital
Satisfaction with professional development	Individual ¹	Hospital
Satisfaction with autonomy	Individual ¹	Hospital
Satisfaction with nurse management	Individual ¹	RN workgroup
Job Enjoyment	Individual ¹	RN workgroup
Satisfaction with task	Individual ¹	RN workgroup
Satisfaction with RN-RN interaction	Individual ¹	RN workgroup
Satisfaction with RN-MD interaction	Individual ¹	RN workgroup
Satisfaction with decision-making	Individual ¹	RN workgroup
Satisfaction with professional status	Individual ¹	RN workgroup
Fuzzy Emergence		
Enough time with patients	Individual	RN workgroup
Enough time to document	Individual	RN workgroup
Patient flow not affected by staffing	Individual	RN workgroup
RNs working \leq 12 hours last shift	Individual	RN workgroup
RNs taking meal break	Individual	RN workgroup
RNs not floating off unit	Individual	RN workgroup
Intent to stay on unit	Individual	RN workgroup

Table 12 continued
 Type of Construct in RN Workgroup Intent to Stay Model

Construct	Level of origin	Conceptual level
Compilation Emergence by Variance		
Age diversity	Individual	RN workgroup
Unit tenure diversity	Individual	RN workgroup
Education diversity	Individual	RN workgroup
National nursing certification diversity	Individual	RN workgroup
Shift worked diversity	Individual	RN workgroup
Schedule rotation diversity	Individual	RN workgroup

¹For composition emergence by referent shift consensus constructs, the level of origin was individual because individual survey participants were the measurement source, although survey items were worded at the workgroup level

CHAPTER III

METHODS

Chapter III describes the methodology used to examine relationships depicted in the RN Workgroup Intent to Stay Model (Figure 1, p. 2). I describe how I met the multilevel model requirement of alignment of construct conceptual level, measurement, and representation for analysis, as well as sampling and analytic plans. Data decisions were based on whether the construct measured a global descriptive property, or a property emerging from a lower level, as well as the specific emergent process involved. I describe how the plan for the RN workgroup sample considered each level of measurement. I conclude Chapter III with a description of the analytic plan for the secondary aim of examining the appropriateness of a workgroup level measurement model for intent to stay, and the primary aim of examining relationships depicted in the RN Workgroup Intent to Stay Model.

Research Design

I used secondary analysis of cross-sectional NDNQI data to test the accuracy of the hypothesized RN Workgroup Intent to Stay Model (Figure 1, p.2). I used a multilevel research approach to explicate the hospital, RN workgroup, and individual RN levels embodied in the model.

Secondary Data Analysis

Nursing scholars have come to view secondary analysis of national data sets as an indispensable methodology because it allows researchers to ask more complicated questions, conduct more sophisticated analysis, and study more

representative samples than generally is possible within the resources available for individual prospective studies (Magee, Lee, Giuliano, & Munro, 2006).

I conducted a secondary analysis of data from the National Database of Nursing Quality Indicators (NDNQI). In 1998, recognizing concerns about RN job satisfaction, RN staffing, and quality of patient care within acute care hospitals, the ANA established the NDNQI as part of its Patient Safety and Nursing Quality initiative (ANA, 1995). The NDNQI was based on Donabedian's quality framework, which holds that the structure and processes of care influence patient outcomes (Donabedian, 1988, 1992). Within this framework, the NDNQI facilitates assessment of nurses' impact on nurse sensitive indicators, for example pressure ulcers and patient falls, at the nursing unit level. The NDNQI also monitors regional and national trends in nursing unit staffing, including nursing care hours per patient day, nurse skill mix, RN education, and RN certification.

NDNQI is constructed from an epidemiological perspective to examine the nurse-sensitive patient outcomes at the level of nursing care units, rather than individuals, either patients or nurses, or hospitals. Epidemiology is concerned with inferences derived from observations of health related phenomena in human population groups (Lilienfeld & Stolley, 1994). The NDNQI is uniquely designed to report indicator data to member hospitals by individual nursing unit. NDNQI data enables hospitals to develop interventions that are targeted to specific nursing care units. Comparison data is provided by unit type. The first NDNQI unit types, critical care, step-down, medical, and surgical, were based on patient acuity and intended as a

form of risk adjustment for the first nurse-sensitive outcome indicators reported, pressure ulcers and patient falls. Additional unit types have been added to accommodate new indicators and to enable hospitals to include all RN workgroups who provide direct patient care in the RN Survey.

Two previous scholars have conducted secondary analyses of data from the NDNQI in their dissertations (Elliott, C.G.S., 2006; Klaus, S., 2006). The purpose of the Elliott dissertation was to determine the psychometric properties of the NDNQI-Adapted Index of Work Satisfaction scales. The aims of the Klaus dissertation included to test the differences in job satisfaction components between four birth cohorts of RNs, and to test a conceptual model adapted from Taunton et al. (2004) using different birth cohorts. The purpose of my research was to extend work of previous researchers in advancing a model of RN workgroup intent to stay. The unique aspects of this study included developing a multilevel model, including Magnet hospital designation in the model, and exploring intent to stay as a workgroup level construct. This study was the first to examine the validity of intent to stay as a workgroup level phenomenon.

Multilevel Model

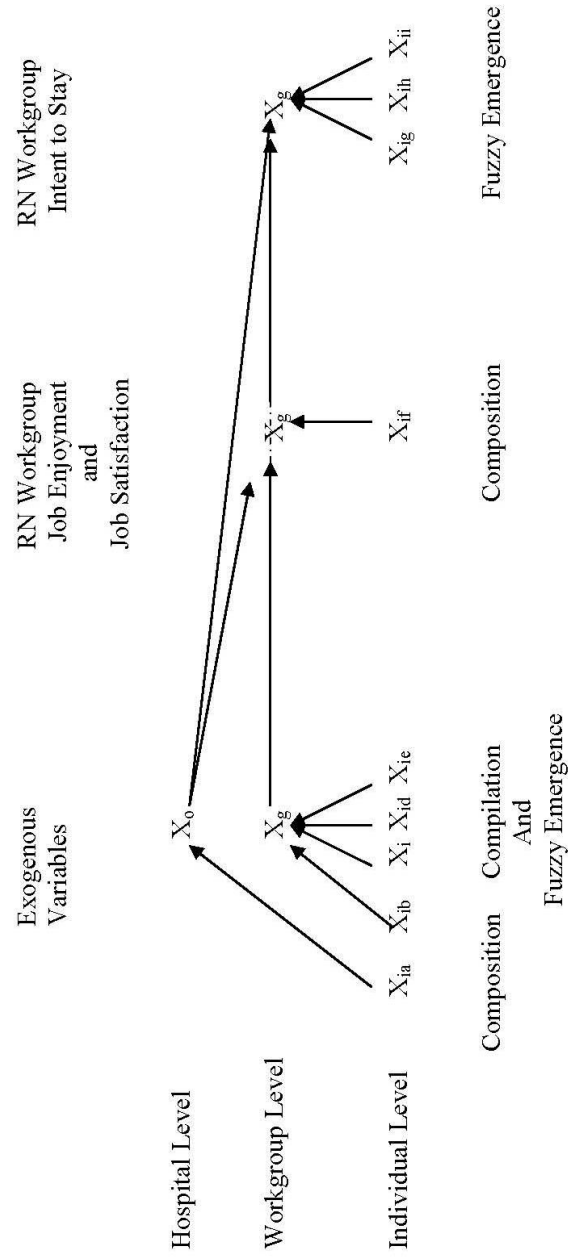
The RN Workgroup Intent to Stay Model (Figure 1, p. 2) is a multilevel model, incorporating characteristics of hospitals (organizations), RN workgroups on nursing units (groups), and individual RNs. The multilevel nature of the model identifies it as an organizational systems theory, based on the axiom that organizations are systems incorporating organizational, group, and individual levels

(Kozlowski and Klein, 2000). This study used the multilevel conceptual and methodological framework of organizational science, as described by Kozlowski and Klein.

A multilevel framework necessitates the alignment of construct theoretical level, measurement, and representation for analysis, as well as the type of multilevel model, the sampling strategy, and the plan for analyzing model relationships (Kozlowski & Klein, 2000). In the conclusion of Chapter II, I identified the theoretical level of model constructs. In Chapter III, I identify the type of multilevel model I consider the RN Workgroup Intent to Stay Model (Figure 1, p. 2) to be, describe my plan for level alignment of the sampling strategy, construct measurement and representation for analysis, and specify the analytic plan for the study.

Kozlowski and Klein (2000) would classify the first phase of the model, depicting the relationship between the exogenous variables and job satisfaction, as a cross-level model with mixed determinants (see Figure 4, p. 112). Hospital level and RN workgroup level determinants are hypothesized to affect the workgroup level variables of RN workgroup job enjoyment and job satisfaction. RN satisfaction with nursing administration, professional development, and autonomy are hospital level determinants. All other determinants are RN workgroup level. Kozlowski and Klein would classify the second phase of the model, depicting the relationship between RN workgroup job satisfaction and intent to stay on the unit, as a single, group-level model with mixed construct properties (see Figure 4). RN workgroup job satisfaction and job enjoyment variables are hypothesized to affect RN workgroup intent to stay.

Figure 4
Cross-level Constructs of RN Workgroup Intent to Stay Model



Setting and Sample

I began refinement of the RN Workgroup Intent to Stay Model (Figure 1, p. 2) by testing it in adult medical units. The study is a secondary data analysis of data from the National Database of Nursing Quality Indicators (NDNQI) 2006 RN Survey. Sampling criteria for each level of this multilevel study are listed in Table 13 (p. 140). The number of participants in the 2006 RN Survey and in the study sample is listed in Table 14 (p. 141). I describe multilevel research sampling issues, as well as participating hospitals, units, and RNs below.

Multilevel Research Sampling

Sampling issues in multilevel research are comparable to sampling issues in individual level theoretical models. Just as it is important for researchers testing individual level models to include samples with adequate between-individual variability in model constructs, it is important for researchers testing multilevel to include samples with adequate variability in model constructs at all relevant levels of the model (Kowloweski & Klein, 2000). Testing the RN Workgroup Intent to Stay Model (Figure 1, p. 2) required an adequate number and diversity of hospitals, RN workgroups within hospitals, and individual RNs within these workgroups. To ensure representativeness of the aggregated workgroup data, I excluded workgroups with fewer than five RNs or less than a 50% response (Verran, Gerber, & Milton, 1995).

The RN Workgroup Intent to Stay Model includes workgroup level consensus as well as variance constructs. Because consensus constructs need adequate within-

group homogeneity, the sample should be composed of workgroups in which RNs have worked together for an adequate length of time to allow shared perceptions to develop. Eligibility criterion for the NDNQI RN Survey includes RNs who have been a member of the workgroup a minimum of three months. The variance constructs require a sample composed of RN workgroups with substantial variability in the variance constructs (e.g., demographic characteristics and work schedule requirements).

Hospitals

Approximately 16% of the nation's hospitals participate in NDNQI. In August 2006, over 1,000 acute care hospitals from all 50 states and the District of Columbia were NDNQI members. Hospitals commit resources to join NDNQI for three primary reasons: to assist in quality improvement efforts, to document compliance with JCAHO staffing effectiveness standard, and to assist in efforts to gain Magnet designation.

In 2006, 494 hospitals participated in the RN Survey (see Table 15, p. 142), representing approximately 50% of NDNQI member hospitals. The study sample was limited to the 157 hospitals that selected the RN Survey with Job Satisfaction scales that included eligible units. Of the hospitals in the study sample, 27% had achieved Magnet designation, 57% had 300 or more beds, 61% were either academic medical centers or teaching hospitals, 86% were not-for-profit, 90% were located in an urban area, and 99% were general, rather than specialty, hospitals.

The study sample hospitals were similar to the 242 hospitals with medical units that had 5 or more responses and 50% or greater response rate. Of these 242 hospitals, 27% had achieved Magnet designation, 55% had 300 or more beds, 57% were either academic medical centers or teaching hospitals, 84% were not-for-profit, 90% were located in an urban area, and 99% were general, rather than specialty, hospitals.

Units

In 2006, 11,383 units participated in the RN Survey (see Table 14, p. 141). The study sample was limited to the 373 medical units with 5 or more responses and 50% or higher response rate in a hospital selecting the NDNQI RN Survey with Job Satisfaction Scales. The number of study sample medical units per hospital averaged 2.5 and ranged from 1 to 9. The average number of eligible RNs per unit was 27, and ranged from 6 to 59. The average number of responding RNs per unit was 21, ranged from 5 to 48, while the average unit response rate was 78%.

The study sample medical units were similar to the 551 medical units in the survey with 5 or more responses and 50% or higher response rate. Among these 551 units, the number of units per hospital averaged 2.3 and ranged from 1 to 9. The average number of eligible RNs per unit was 26, and ranged from 5 to 70. The average number of responding RNs per unit was 20, ranged from 5 to 70, while the average unit response rate was 78%.

RNs

In 2006, 176,842 RNs participated in the RN Survey (see Table 14, p. 141). The study sample was limited to the 7,730 RNs in eligible units. Across sample units, 93% of workgroup RNs were female, 66% were white, and 15% were Asian. Nearly all workgroup RNs worked full-time (78%) in a staff nurse role (96%). The majority of workgroup RNs (51.3%) had a baccalaureate degree or higher. The average age of workgroup respondents was 39, average years in practice as an RN was 10.7, and average years on their current unit was 5.2.

RNs in sample unit workgroups were similar to the 11,194 RNs in all medical units in the survey with 5 or more responses and 50 percent or higher response rate. Across these 551 units, 94% of workgroup RNs were female, 68% were white, 79% worked full-time, 95% worked in a staff nurse role, and 49% had a baccalaureate degree or higher. The average age of workgroup respondents was 40, average years in practice as an RN was 11.1, and average years on their current unit was 5.4.

Measures

This study combined RN Survey data with other data collected from NDNQI member hospitals, including unit staffing, hospital characteristic, and unit type. This section describes items selected from the RN Survey, as well as measures used to collect unit staffing information, selected hospital characteristics, and unit type.

Multilevel Research Measurement

In multilevel research, the level of measurement of each construct should be determined by the type of construct. Nursing unit type categories and staffing data

are observable, descriptive characteristics of nursing units. Similarly, Magnet designation, metropolitan area location, number of beds, ownership, and teaching status are observable characteristics of hospitals. As global properties of units and hospitals, a single expert individual, such as the hospital site coordinator, may serve as the expert informant (Kozlowski & Klein, 2000).

Data to assess constructs emerging from the individual level are collected from individual RNs, matching the level of origin (Kozlowski & Klein, 2000). This includes perceptions of nurse leadership, work context, workgroup diversity, job satisfaction, and intent to stay. The individual level data also allows the evaluation of the hypothesized model of emergence.

RN Survey

NDNQI first offered the annual RN Survey with Job Satisfaction Scales in 2002 after extensive pilot testing. The RN Survey with Job Satisfaction Scales—Short Form was added as an alternative option in 2004, and the RN Survey with Practice Environment Scales (Lake, 2002) was added in 2006. Selected items from the 2006 RN Survey with Job Satisfaction Scales data were analyzed for this study (see Appendix B, page 217, and Table 16, p. 143). The survey contains the NDNQI-Adapted RN Job Satisfaction Scales, as well as intent to stay, work contextual items, and RN demographic items. Survey items were selected that represent concepts included in the RN Workgroup Intent to Stay Model (Figure 1, p. 2).

Intent to stay

Intent to remain in the current job is measured by one item (see Table 16, p. 149), “What are your job plans for the next year?” For the current study, the six response options were collapsed into two categories, “stay in my current position” and all others. Intent to stay then was expressed as the percent selecting the option “stay in my current position”. The secondary aim of this study was to examine the appropriateness of a workgroup level measurement model for intent to stay.

Job Satisfaction Scales

The NDNQI-Adapted RN Job Satisfaction Scales include 71 items in 11 domains (scales or subscales). Forty-four items and seven scales were adapted from Stamps’ (1997) nurse Index of Work Satisfaction (IWS) (adapted with permission of Dr. Paula Stamps) (see Table 16, pp. 143-146); twenty items in three domains were adapted from the Aiken and Patrician (2000) Nursing Work Index-Revised (NWI-R) (adapted with permission from Dr. Aiken) (see Table 16, pp. 147-148); seven items in one domain were extracted from the Brayfield and Rothe (1951) general Index of Job Satisfaction (IJS) (see Table 16, p. 149). The three instruments have been used extensively and have established support for reliability and validity.

Stamps views job satisfaction, or “the extent to which people like their jobs” (Stamps, 1997, p. 13), as a complex, multidimensional construct that captures reactions to specific components of work. The NDNQI adaptation of the RN Job Satisfaction Scales shifted the focus of the items from the individual RN to the unit workgroup (Taunton et al., 2004). The group-level focus is consistent with all other

NDNQI indicators (e.g., staffing, pressure ulcer prevalence), which are analyzed at the nursing unit level. As described by Boyle, Miller, Gajewski, Hart, and Dunton (2006), the theoretical basis for the NDNQI adaptation of the job satisfaction scales to the RN workgroup is the sociology of organization and work (e.g., Aiken & Hage, 1968; Homans, 1950). According to Homans, group values both reflect and influence group member attitudes. Researchers (Aiken & Patrician, 2000; Kramer & Hafner, 1989; Lake, 2002) who developed and revised the Nursing Work Index considered nursing workgroup influence on job satisfaction. The Nursing Work Index-Revised (Aiken & Patrician) and the Practice Environment Scale of the Nursing Work Index-Revised (Lake, 2002) exhibit reliability and validity at the individual and workgroup level.

In order to measure workgroup level constructs, job satisfaction items were adapted to change the focus from the individual RN to the unit RN workgroup. For example, “I have sufficient time for direct patient care” now is “Nurses with whom I work would say that they have sufficient time for direct patient care”. The eleven NDNQI-Adapted Job Satisfaction Scales, their definitions, and an example item for each follow. Participants respond on a 6-option Likert-type scale: strongly disagree, disagree, tend to disagree, tend to agree, agree, and strongly agree. The stem for all example items is “Nurses on my unit would say that.”

- Task (IWS): Activities that must be done as a regular part of the job.

Example: They have plenty of time to discuss patient care problems with other nursing personnel.

- RN-RN Interactions (IWS): Formal and informal contact among nurses during working hours. Example: There is a good deal of teamwork among nursing personnel.
- RN-MD Interactions (IWS): Formal and informal contact with physicians during working hours. Example: Physicians at this hospital look down on the nursing staff.
- Decision Making (IWS): Management policies and practices related to decision making. Example: They have all the voice they want in planning policies and procedures for the unit.
- Autonomy (IWS): Amount of independence, initiative, and freedom permitted or required in daily work activities. Example: Nurses need more autonomy in their daily practice.
- Professional Status (IWS): Importance or significance of the job, both in nurses' and others' view. Example: What they do on the job is really important.
- Pay (IWS): Cash remuneration and fringe benefits received for work performed. Example: Their present pay is satisfactory.
- Professional Development (NWI-R): Opportunity and access to career development. Example: They have opportunities for advancement.
- Supportive Nursing Management (NWI-R): Satisfaction with unit managers in relation to decision, support, and consultation. Example: Their nurse

manager backs up the nursing staff in decision making even in conflicts with physicians.

- Nursing Administration (NWI-R): The visibility and power of the chief nursing officer. Example: Their chief nursing executive is equal in power to other top-level hospital executives.
- Job Enjoyment (IJS): The extent to which nurses like their jobs in general. Example: They find real enjoyment in their jobs.

Psychometric analysis of the NDNQI RN Job Satisfaction Scales has been completed (Elliott, 2006; Elliott & Boyle, 2003, Taunton et al., 2004; Taunton, Bott, Boyle, Miller, & Elliott, C., 1999-2004), including exploratory factor analysis, confirmatory factor analysis, internal consistency reliability, and group-level reliability and validity.

Individual level reliability and validity of the NDNQI-Adapted Job Satisfaction Scales has been well established. Table 17 (p. 155) provides subscale Cronbach's alphas, which range from .49-.87 for data collected in 2001, .81-.93 for data collected in 2003, and .81-.92 for data collected in 2005, demonstrating high internal consistency reliability.

Initial exploratory principal component factor analysis indicated that seven factors, corresponding to the original Stamps subscales, explained 53% of the variance in the Adapted-IWS items (for factor loadings, see Table 17, p. 155) (Taunton et al., 2004). Principle components factor analysis indicated that a single factor explained 58% of the variance in the Job Enjoyment items (Taunton et al.).

Structural equation modeling procedures were used for confirmatory factor analysis, in which model fit was evaluated using the comparative fit index (CFI) and the root mean square residual statistic (RMR) (Taunton et al.). The 7-factor structure of the Adapted-IWS (CFI [719] = .88; RMR = .05) was confirmed, as was the unidimensional structure for Job Enjoyment (CFI [14] = .97; RMR = .04) (Taunton et al.). Criterion-related concurrent validity was supported in a regression analysis in which scores on the Adapted-IWS explained 56% of the variance on the general satisfaction measure of job enjoyment (Taunton et al.).

Exploratory principle component factor analysis conducted with 2003 data, after the NWI-R items had been added to the survey, indicated that eleven factors, corresponding to the seven Adapted-IWS scales, three Adapted-NWI-R scales, and Job Enjoyment explained 62% of the total variance (Ammouri, Ebbert, Kosiak, & Peterson, 2003). Confirmatory factor analysis, using structural equation modeling procedures and 2005 data, confirmed the 11-factor structure (CFI [2398] = .89; SRMR = .05) (Boyle, Miller, Gajewski, & Dunton, 2006).

Elliott (2006) conducted analysis supporting aggregate level (i.e., hospital and workgroup) reliability and validity of the NDNQI-Adapted Job Satisfaction Scales. Most NDNQI Job Satisfaction Scales are included in the RN Workgroup Intent to Stay Model (Figure 1, p. 2) as RN workgroup level variables. However, satisfaction with autonomy, professional development, and nursing administration are conceptualized and included in the model as hospital level variables. For this reason, hospital level reliability and validity indices will be presented below for satisfaction

with autonomy, professional development, and nursing administration, whereas workgroup level reliability and validity indices will be presented for all other job satisfaction scales. For her workgroup level analysis, Elliott used 2004 NDNQI RN Survey data limited to workgroups with 5 or more RNs per workgroup and 50% or greater workgroup response rate. Similarly for her hospital level analysis, Elliott used 2004 NDNQI RN Survey data limited to hospitals with 50% or greater hospital response rate.

Aggregate-level reliability indices reported by Elliott (2006) are generally robust (see Table 18, p. 156), meeting Glick's (1985) criterion of .60 or greater for group-level Cronbach's alphas, interitem correlation coefficients, and ICC(2) intraclass correlation coefficients. Aggregate-level coefficient alphas range from .91-.97, and intraclass correlation coefficients, ICC(2), range from .82-.89 (see Table 18, p. 156). Several scales contain items with aggregate-level interitem coefficients less than .60. Nevertheless, all scales meet criterion recommended by Verran et al. (1995) that a minimum of 60% of aggregate-level interitem correlations be equal to or greater than .60, with the exception of the professional development scale (see Table 18, p. 156).

Aggregate-level validity indicates the scale mean is a measure of an aggregate-level phenomenon. Workgroup level validity is supported when variability within the workgroup is less than variability between workgroups, whereas hospital level validity is supported when variability within the hospital is less than variability between hospitals (Verran, Mark, & Lamb, 1992). Elliott (2006) provided support for

aggregate-level validity of the Adapted Job Satisfaction scales (see Table 19, p. 157). All subscales meet the within-group reliability criterion for ICC(1) values suggested by Elliott (.05 small, .12 medium, .30 large) with at least a medium effect (Elliott, p. 68). All subscales meet the within-group consensus criterion for effect size [η^2 (η^2) and ω^2 (ω^2)] values suggested by Elliott (.01 small, .25 medium, .40 large) with mostly a medium effect (Elliott, p. 80). F statistics for all scales were significant at the .05 level of significance.

Work Context and RN Demographics

Questions in the Work Contextual Items section of the survey which were used in the model include perceptions of nurse leadership, work context, and RN demographic items (see Table 16, pp. 149-154). In the current study, the group-level validity of the work context and diversity variables was assumed.

Perceptions of RN workgroup nurse leadership include adequacy of RN orientation, rated on a 6-option Likert-type scale of strongly disagree to strongly agree (see Table 16, p. 150), and RN influence in scheduling, rated on a 5-option scale from very little to very much (see Table 16, p. 152). Work context items include perceptions of appropriate RN assignments, rated on a 6-option Likert-type scale of strongly disagree to strongly agree (see Table 16, p. 150), and change in overtime needs in last year, rated on a 3-option scale from increased to decreased (see Table 16, p. 153). RNs were asked to indicate whether or not they had enough time with patients, enough time to document, and whether staffing affected patient flow on their last shift (see Table 16, pp. 150-151). RNs were asked how many hours they

worked on their last shift. For the current study, responses were collapsed into two categories, less than or equal to twelve hours, and over twelve hours (see Table 16, p. 151). RNs were asked to indicate the total duration of their meal breaks. For the current study, response options were collapsed into two categories, less than 15 minutes and equal to or greater than 15 minutes (i.e., taking a meal break) (see Table 16, p. 151). Items regarding breaks were adapted with permission from Dr. Ann Rogers (Rogers, Hwang, & Scott, 2004). RNs were asked how many hours they worked on a unit other than their permanently assigned unit in the last two weeks. For the current study, response options were collapsed into two categories, “only worked on my regular unit” and all others (see Table 16, p. 153).

Demographic items included age and unit tenure (see Table 16, p. 153). The highest level of nursing education was collapsed into two categories, diploma or associate degree, and BSN or higher. RNs were asked to indicate whether or not they held a national nursing certification. RNs were asked to indicate their usual shift. For this study, response options were collapsed into two categories, day shift, and all others. RNs were asked to indicate their usual shift rotation. For this study, response options were collapsed into two categories, do not usually rotate and all others.

Unit Staffing Data

Member hospital site coordinators submit monthly unit staffing data to NDNQI, including nursing care hours and patient days, which I used to calculate patient-to-RN ratio and nursing hours supplied by RNs. Unit data for the three

months prior to survey data collection were used. All values were calculated for each month, then averaged across non-missing months.

Site coordinators submit the number of direct nursing care hours provided by employee and agency RNs, LPNs, and unlicensed assistive personnel (UAP). UAPs are individuals trained to function in an assistive role to nurses in the provision of patient care, as delegated by and under the supervision of the RN, such as nursing assistants, certified nursing assistants (CNAs), and orderlies (NDNQI Project Staff, 2006). The unit total nursing hours per month is the sum of nursing care hours worked on the nursing unit by all levels of nursing care providers. The percent of nursing hours supplied by RNs is calculated by dividing RN hours by total nursing hours. Nursing care hours are limited to staff with direct patient care responsibilities, following National Quality Forum (2004) specifications.

Site coordinators submit the unit's total number of patient days for the month using one of five different methods. The most common method is the sum of the number of patients on the unit at midnight (midnight census) for the month. Investigators have found no differences in patient day data by reporting method (Dunton, Gajewski, & Klaus, 2005). I calculated unit monthly nursing hours per patient day by dividing the total nursing hours by the total patient days. The patient-to-RN ratio, which is used for model testing, is calculated by dividing 24 hours per day by nursing hours per patient day.

Hospital Characteristics

Member hospital site coordinators submit hospital characteristic data to NDNQI, including number of beds, ownership, teaching status, and address, including zip code. Hospital teaching status options include academic medical center, teaching hospital, and non-teaching hospital. Bed size categories include 0-24, 25-49, 50-74, 75-99, 100-199, 200-299, 300-399, 400-499, and ≥ 500 . Ownership categories include not-for-profit, federal government, non-federal government, and for-profit, investor owned. The American Nurses Credentialing Corporation (ANCC) provides NDNQI with a list of hospitals currently designated Magnet facilities, and beginning and end dates of the designation. Metropolitan area hospital location is based on the U.S. Office of Management and Budget metropolitan statistical area standards, which includes one or more counties with an urban core of 50,000 or more population, based on the 2000 United States Census (United States Census Bureau). NDNQI staff members categorize census information for member hospitals using the definitions available on the Census Bureau web site at <http://quickfacts.census.gov/cqi-bin/qfd/lookup>.

Unit Types

In collaboration with NDNQI staff, site coordinators assign a unit type category to each nursing unit following NDNQI Unit Management Guidelines. NDNQI unit type categories, which are based on a combination of patient populations (e.g., adult, pediatric) and patient care specialties (e.g., medical, psychiatry, surgical services), include adult critical care, adult step-down, adult medical, adult surgical,

adult medical-surgical, obstetrics, neonate, pediatrics, psychiatry, surgical services, rehabilitation, emergency department, ambulatory clinics, interventional labs, and other.

My study was limited to the adult medical unit type. Medical units were selected to begin refinement of the RN Workgroup Intent to Stay Model (Figure 1, p. 2) because they are the most common distinct unit type within acute care hospitals. In addition, nursing care on medical units can be described as the underlying type of nursing care occurring on all nursing units. Patients in all unit types require the administration of medications and the management of medical diagnoses, such as diabetes or hypertension, for instance. All other unit types, in this sense, represent specialized care in comparison to medical units.

Data Collection

NDNQI data are collected through the Internet. The NDNQI clearly illustrates the expanding incorporation of the internet into research methodologies that has occurred since the World Wide Web emerged in the early 1990's (Montgomery, 2004; Nahm, Mills, & Resnick, 2004).

NDNQI Member Website

Site coordinators of member hospitals enroll nursing units and submit all data (e.g., hospital characteristics and unit staffing data) via the NDNQI member website. Site coordinators confirm hospital characteristics and submit indicator data on a quarterly basis, with data submission deadlines in February, May, August, and

November. Site coordinators must enroll nursing units in the database prior to submitting unit data or selecting the unit for participation in the RN survey.

NDNQI RN Survey

NDNQI offers the annual, web-based survey for a 3-week period during the months of April, May, June, August, September, and October. The survey also was available in October of 2006 for paper data collection. Hospitals voluntarily register for a data collection month and data collection method. Each hospital appoints a site coordinator. At the NDNQI website, site coordinators obtain a standardized web or paper data collection protocol (see Appendix C) and a unique hospital identification code. Site coordinators select nursing units to participate in the survey from a list of their units enrolled in NDNQI appearing on the website, and enter the number of eligible RNs on each nursing unit. To assure confidentiality of participation and anonymity of data, names of RNs were not collected for either the paper or web survey. Site coordinators publicize the survey internally, offer incentives within protocol guidelines, and distribute two reminder postcards during the 3-week data collection period. Prior to the survey, site coordinators distribute two letters to all eligible RNs prior to the survey: an invitation letter from NDNQI describing procedures in place to protect respondent anonymity and confidentiality (Appendix D), and an invitation letter from their hospital's nursing administration listing the unique hospital identification code RNs must enter on the web or paper survey.

For the web survey, site coordinators must ensure that adequate information technology resources exist within their hospital to support the survey. Site

coordinators identify computers within the facility that could be available for an uninterrupted 20 minutes, and pilot test computers to assure internet access to NDNQI. In addition, RNs can complete the survey from any computer (e.g., home computer) with internet access. Site coordinators are encouraged to include nurse managers and other non-eligible RNs in pilot testing so they can describe the process and encourage nurses who might be reluctant to use the computer.

For the paper survey, NDNQI shipped data collection packets to site coordinators, who coordinated the human resources needed to add a survey invitation letter and list of unique unit codes to each packet, distribute the packets to eligible RNs. After completion, each participant sealed the completed survey in a provided envelope and returned it to a central secure depository. At the end of the data collection period, the site coordinator shipped the sealed envelopes to a company contracted by NDNQI to scan the instruments. This company provided a raw data file to NDNQI.

Data Management

All NDNQI data are maintained as a relational database in a secure Microsoft SQL Server data repository (Clochesy, 2004). Survey, unit staffing, hospital characteristic, and unit type data are collected and stored in separate SQL tables. Data files for this study were extracted from SQL Server via a transitional ACCESS database into Statistical Program for Social Sciences (SPSS 14.0). All data were merged into one SPSS data file for analysis.

The raw, individual level survey data were examined for duplicate web responses, response sets in paper data, and, in all data, missing items and logical consistency of responses to interdependent items. Duplicate web responses were generally prevented by survey programming, including scripting and session based variables. Duplicate entry criteria were applied to the raw data to confirm program function, which identify duplicate responses by item response, IP address, and time of submission (Kaye & Johnson, 1999). Paper responses with response sets (i.e., identical responses to more than 20 consecutive items) were deleted. Because positively and negatively worded items appear throughout the survey, response sets of greater than 20 consecutive items on the paper survey were felt to occur when an RN selected a single response option without reading any item. Web and paper responses are deleted if they failed the number of non-missing item criteria, which required enough non-missing items to calculate one job satisfaction scale. Calculation of each job satisfaction scale required a minimum of four non-missing items. Inconsistent responses to interdependent items (e.g., age, professional and unit tenure) were examined for logical consistency of response. Where logical inconsistencies were found, the variable response was deleted. Out of range values, which were only possible in paper data, were also deleted. Cleaned data from both web and paper data collections were uploaded back to the SQL repository for consistency of future data extractions. Prior to calculating job satisfaction subscales, negatively worded items were reverse coded, so that the orientation of all items was consistent.

Data Aggregation

Emergent constructs tested in the RN Workgroup Intent to Stay Model (Figure 1, p. 2) were measured at the level of origin, and aggregated to the RN workgroup or hospital level for analysis. According to Kozlowski and Klein (2000), the form of emergence should be reflected in the model of data aggregation, combination, and representation for analysis. Isomorphic constructs should generally be represented for analysis as a mean value (Kozlowski and Klein). In the model tested in this study, RN workgroup job satisfaction (see Table 16, p. 143-148), job enjoyment (see Table 16, p. 148), adequacy of workgroup orientation (see Table 16, p. 150), workgroup influence in scheduling (see Table 16, p. 152), appropriate workgroup patient assignments (see Table 16, p. 150), and change in unit overtime needs (see Table 16, p. 153) were aggregated as mean values.

Variables representing fuzzy emergence constructs were measured as the dichotomous presence or absence of an event, perception, or cognition, then aggregated and represented for analysis as unit rates (Kozlowski & Klein, 2000), specifically percent of unit RNs. In addition to RN workgroup intent to stay (see Table 16, p. 149), the following variables were included: percent of workgroup who had enough time to document (see Table 16, p. 150), enough time with patients, patient flow not affected by staffing, and percent of workgroup working ≤ 12 hours last shift, taking a meal break (see Table 16, p. 151), and not floating off unit (see Table 16, p. 153).

Variables representing constructs emerging by variance compilation were transformed into indices of variance to represent workgroup diversity (e.g., diversity in age, unit tenure, and education) (Kozlowski & Klein, 2000). Polytomous variables (i.e., age and unit tenure, see Table 16, p. 153) were aggregated to the workgroup level as means, and then transformed into variance indices using the formula $s_x^2 = (1/N)[\Sigma (X-M)^2]$ (Lindell & Brandt, 2000). Dichotomous variables (i.e., education, certification, shift worked, and schedule rotation, see Table 16, pp. 152 & 154) were aggregated to the workgroup level as rates of respondents endorsing one of the two categories. Workgroup level rate variables were transformed into variance indices using the formula $s_x^2 = p(1-p)$, where p = the proportion of respondents endorsing one of the two categories (Lindell & Brandt).

Analytic Plan

Secondary Aim

The secondary aim was to examine the appropriateness of a workgroup level measurement model for the dependent variable, intent to stay. Individual intent to stay is conceptualized as emerging to the workgroup level through the process of fuzzy composition. Bliese (2000) describes the fuzzy composition process and suggests indices to examine construct validity and reliability.

According to Bliese (2000), ICC(2), a measure of group mean reliability, is always an important index to examine in fuzzy composition. As in isomorphic composition, in fuzzy composition groups need reliably different mean values to detect relationships. Glick (1985) suggested .60 as the acceptable criteria for ICC(2).

Construct validity generally is examined using the ICC(1) index in isomorphic composition. When ICC(1) values for variables are either equal to one or equal to zero, the lower -level variable and the aggregate-level variable can be considered equivalent (Bliese, 2000). Fuzzy composition exists when the ICC(1) values are larger than zero. Because intent to stay is a dichotomous variable, an approximation of the ICC(1) index was estimated, as described by Turner, Omar, and Thompson (2006).

In fuzzy composition, analyses involving higher-level constructs are likely to reveal substantially greater relationships at the aggregated level than exist at the individual level (Bliese, 2000). Consequently, correlations between individual level job satisfaction variables and intent to stay that are less than the correlations between aggregated RN workgroup job satisfaction variables and RN workgroup intent to stay provided support for construct validity.

Primary Aim

The primary study aim was to examine relationships depicted in the RN Workgroup Intent to Stay Model (Figure 1, p. 2) within medical units. SPSS 15.0 was used to conduct all analysis. After selecting the final model variables, the model was tested using the linear mixed model statistical procedure.

Selection of Model Variables Tested

Variables included in the model tested were selected from the conceptual model by evaluating variables for multicollinearity. The criterion set for an acceptable correlation for this study was $<.50$.

Linear Mixed Model

Linear mixed modeling (LMM) was selected as the most appropriate statistical methodology (West, Welch, & Galecki, 2007). The RN Workgroup Intent to Stay Model (Figure 1, p. 2) is a hierarchical, cross-level model in that a workgroup level dependent variable, intent to stay, is predicted by both hospital and workgroup level variables. Ordinary least squares (OLS) regression, the typical procedure to analyze predictive models, does not account for dependencies within hierarchical data, and therefore underestimates standard errors. In the RN Workgroup Intent to Stay Model, OLS regression would account for variation across units, but not across hospitals. OLS regression would increase the likelihood of a type 1 error (Park & Lake, 2005), or the chance that statistical significance is obtained falsely.

A linear mixed model is a statistical model that examines linear relationships between a continuous outcome variable and independent variables that may involve a mix of fixed and random effects (West et al., 2007). Linear mixed models distinguish between fixed and random factors in order to account for the dependencies within the model's hierarchical data. Fixed factors are defined in linear mixed models as variables for which all conditions, levels, or response options that are of interest in the study are included (West et al.). All exogenous and intervening variables in the RN Workgroup Intent to Stay Model are included as fixed factors.

Random factors are defined in linear mixed models as variables with conditions or levels that are considered to be sampled randomly from the population of conditions or levels that exist for that variable, and for which inferences are to be

drawn about the entire population (West et al., 2007). Random factors allow the assessment of variation in the dependent variable across levels of the random factor. In the RN Workgroup Intent to Stay Model, a code identifying each individual hospital was included as the random factor, which incorporated the variation in the dependent variable across hospitals not captured by the hospital predictors and control variables included in the model. Inferences to the population of acute care hospitals in the United States can be drawn only with great caution, however, as the sample of hospitals is not a random sample.

A separate linear mixed model analyses were preformed, predicting the model dependent variable intent to stay, and each intervening RN workgroup job satisfaction variable. The RN Workgroup Intent to Stay Model was analyzed as a purely additive model, i.e., interactions among exogenous variables, or among intervening variables were not considered.

In linear mixed-modeling, the fit of the model parameters is assessed using values referred to as information criterion, which adjust for the number of model parameters (West et al., 2007). A smaller value of the criterion indicates a better fit. Two commonly used information criterion are the Schwartz's Bayesian Information Criterion (BIC), and the Akaike Information Criterion (AIC). The BIC was selected because it applies the greater penalty for models with more parameters (West et al.).

In addition, a ratio test was performed using BIC values, in which each full model with all predictors is compared to its corresponding null model with no predictors. Each linear mixed model analysis was performed twice: as a full model

with all predictors, and as a null model with no predictors. The ratio test statistic was then calculated by subtracting the BIC value of the full model from the BIC value of the null model. The ratio test statistic, which has a χ^2 distribution (West et al., 2007), was used to determine whether the full model BIC is significantly lower than the null model BIC.

Conventional regression models provide an R^2 statistic, which is interpreted as the amount of variance of the outcome variable accounted for by the set of predictors in the model. A pseudo R^2 statistic was calculated by squaring the zero-order correlation coefficient of the predicted and actual values of the dependent variable for each linear mixed model analysis (communication with B. Gajewski, September 12, 2007).

Linear mixed-modeling provides unstandardized coefficients as parameter estimates, based on restricted maximum likelihood estimation (REML). Significant parameter estimates for continuous independent variables are interpreted similar to regression coefficients. Parameter estimates for categorical predictors are provided for all categories except one, which is used as the comparison group. Significant parameter estimates for categorical predictors are interpreted in relation to comparison group.

To allow calculation of direct, indirect, and total effects of model variables on intent to stay, parameter estimates were standardized using the following formula (communication with B. Gajewski, June 5, 2007):

$$(\text{parameter estimate}) \times (\text{SD independent variable} / \text{SD dependent variable})$$

Standardized parameter estimates were interpreted as direct effects. Indirect effects of exogenous variables on job plans were calculated as the product of significant standardized parameter estimates, and total effects were calculated as the sum of direct and indirect effects. Standardized effects also allow the direct comparison of the effect of different model predictors on the dependent variable.

Ethical Considerations

The University of Kansas School of Nursing, under contract from the American Nurses Association, conducts the NDNQI RN Survey. Prior to the recruitment of NDNQI member hospitals, subjects, or the collection of data, NDNQI investigators requested and gained approval for the project from the Human Subjects Committee (HSC) of the University of Kansas Medical Center (KUMC). In accordance with Federal regulations regarding Health Insurance Portability and Accountability Act (HIPAA), NDNQI investigators completed the required HIPAA certification for conducting research involving human subjects in addition to the required Human Subjects Protection training.

Return of the survey implied informed consent of respondents. Site Coordinators were provided with the KUMC/HSC approved data collection protocol (Appendix C). Data security has been reviewed and revised as recommended by KUMC internet security experts. Prior to the release of the data for this analysis, the data were de-identified as specified by HIPAA and maintained on a secure university server. Because no identifying information was requested on the original survey, anonymity of the respondents remained protected. I requested and received approval

to use the existing database from NDNQI (Appendix E). My Human Subject Protecting Training and HIPPA Training Certificates are included as Appendix F. Before performing the secondary analysis on the 2006 RN Survey data, I requested KUMC HSC review of my proposal and received exempt status.

Summary

In Chapter III, I described the methodology used for testing the RN Workgroup Intent to Stay Model (Figure 1, p. 2). Using a multilevel model framework required the careful alignment of construct conceptual level, measurement, and representation for analysis, as well as sampling and analytic plans. This study was the first to develop a multilevel model of intent to stay, to explore the appropriateness of a work-group level measurement model for intent to stay, and to include measures of RN workgroup diversity. In Chapter IV, findings are presented of the analysis used to examine the appropriateness of a workgroup level measurement model for intent to stay and to examine relationships depicted in the model.

Table 13

Study Inclusion Criteria

Level	Criteria
Hospital	Member of NDNQI Participated in 2006 NDNQI RN Survey Selected the RN Survey with Job Satisfaction Scales
Unit	Adult Medical unit type ≥ 5 RN responses and $\geq 50\%$ response rate
RN	Employee of hospital Full-time, part-time, or per-diem Spend $\geq 50\%$ of time in direct patient care Employed ≥ 3 months on unit or workgroup

Table 15
 Characteristics of Hospitals in 2006 NDNQI RN Survey and Study Sample

	2006 NDNQI RN Survey Hospitals		Study Sample Hospitals	
	Number	%	Number	%
Total	494		157	
Magnet designation	129	26%	42	27%
Metropolitan area	436	88%	141	90%
Hospital ownership				
Not-for-Profit	426	86%	135	86%
For-Profit	11	2%	3	2%
Government	57	12%	19	12%
Hospital teaching status				
Academic Medical Center	81	16%	41	26%
Teaching Hospital	165	33%	55	35%
Non-Teaching Hospital	248	50%	61	39%
Type of hospital				
General Hospital	460	93%	155	99%
Specialty Hospital	34	7%	2	1%
Number of beds				
<100	72	15%	2	1%
100-199	123	25%	36	23%
200-299	103	21%	30	19%
300-399	86	17%	30	19%
400-499	49	10%	24	15%
=>500	61	12%	35	22%

Table 16
RN Survey Items Selected for the RN Workgroup Intent to Stay Model, Type of Multilevel Construct, and Representation in Model Testing

NDNQI RN Survey ¹	Items Selected for Model	Model Variable	Type of Multilevel Construct and Representation in Model Testing
	NDNQI-Adapted Index of Work Satisfaction ² Stem: Nurses with whom I work would say that: Response options: strongly agree, agree, tend to agree, tend to disagree, disagree, strongly disagree		
<u>Task</u>		Endogenous Variable RN Workgroup Satisfaction with Task	Composition Emergence by Referent Shift Consensus. Aggregated to unit level as subscale mean, then transformed into T-scores. Represented for analysis as subscale T-score.
	1. They are satisfied with the nursing care they provide to patients.		
	2. They could do a better job if they did not have so much to do all the time.		
	3. They have plenty of time to discuss patient care problems with other nursing service personnel.		
	4. They have sufficient time for direct patient care.		
	5. They have plenty of opportunity to discuss patient-care problems with other nursing service personnel.		
	6. They could deliver much better patient care if they had more time with each patient.		

Table 16 continued
 RN Survey Items Selected for the RN Workgroup Intent to Stay Model, Type of Multilevel Construct, and Representation in Model Testing

NDNQI RN Survey ¹ Items Selected for Model	Model Variable	Type of Multilevel Construct and Representation in Model Testing
<u>Nurse-Nurse Interaction</u>		
1. Nursing personnel pitch in and help each other when things get in a rush.	Endogenous Variable RN Workgroup Satisfaction with RN- RN Interaction	Composition Emergence by Referent Shift Consensus. Aggregated to unit level as subscale mean, then transformed into T-scores. Represented for analysis as subscale T-score.
2. It is hard for new nurses to feel "at home" on the unit.		
3. There is a good deal of teamwork among nursing personnel.		
4. They are satisfied with the interactions among the nursing staff.		
5. Nursing personnel are not as friendly and outgoing as they would like.		
6. The nurses on our unit support each other.		
<u>Nurse-Physician Interaction</u>		
1. Physicians in general cooperate with nursing staff.	Endogenous Variable RN Workgroup Satisfaction with RN- MD Interaction	Composition Emergence by Referent Shift Consensus. Aggregated to unit level as subscale mean, then transformed into T-scores. Represented for analysis as subscale T-score.
2. They are not satisfied with their interactions with hospital physicians.		
3. There is a lot of teamwork between nurses and doctors on our unit.		
4. Physicians at this hospital look down too much on the nursing staff.		
5. Physicians respect the skill and knowledge of the nursing staff.		
6. Physicians at this hospital generally appreciate what the nursing staff do.		

Table 16 continued
 RN Survey Items Selected for the RN Workgroup Intent to Stay Model, Type of Multilevel Construct, and Representation in Model Testing

NDNQI RN Survey ¹ Items Selected for Model	Model Variable	Type of Multilevel Construct and Representation in Model Testing
<u>Decision-Making</u>		
1. There is ample opportunity for nursing staff to participate in administrative decision-making processes.	Endogenous Variable RN Workgroup Satisfaction with Decision-Making	Composition Emergence by Referent Shift Consensus. Aggregated to unit level as subscale mean, then transformed into T-scores. Represented for analysis as subscale T-score.
2. Administrative decisions at this hospital interfere too much with patient care.		
3. They are not satisfied with their participation in decision-making for the unit.		
4. They have all the voice they want in planning policies and procedures for the unit.		
5. Nursing administrators generally consult with the staff on daily problems.		
6. They have the freedom in their work to make important decisions.		
7. They can count on nursing administrators to back them up.		
<u>Autonomy</u>		
1. They have sufficient input into the program of care for each of their patients.	Exogenous Variable Hospital level: Satisfaction with Autonomy	Composition Emergence by Referent Shift Consensus. Aggregated to hospital level as subscale mean, then transformed into T-scores. Represented for analysis as subscale T-score.
2. They have too much responsibility and not enough authority.		
3. Nurses have a good deal of control over their own work.		
4. They are frustrated sometimes because their activities seem programmed for them.		

Table 16 continued
 RN Survey Items Selected for the RN Workgroup Intent to Stay Model, Type of Multilevel Construct, and Representation in Model Testing

NDNQI RN Survey ¹	Items Selected for Model	Model Variable	Type of Multilevel Construct and Representation in Model Testing
	<u>Autonomy continued</u>		
	5. They are required sometimes to do things on the job that are against their better professional judgment.		
	6. Nurses need more autonomy in their daily practice.		
	7. They are free to adjust their daily practice to fit patient needs.		
	<u>Professional Status</u>		
	1. Staff in other departments appreciate nursing.		
	2. They are proud to talk to other people about what they do on the job.		
	3. They are satisfied with the status of nursing in the hospital.		
	4. Patients (family members) acknowledge nursing's contribution to their care.		
	5. They recommend this hospital to others as a good place for nurses to work.		
	6. Their work contributes to a sense of personal achievement.		
		Endogenous Variable RN Workgroup Satisfaction with Professional Status	Composition Emergence by Referent Shift Consensus. Aggregated to unit level as subscale mean, then transformed into T-scores. Represented for analysis as subscale T-score.

Table 16 continued
RN Survey Items Selected for the RN Workgroup Intent to Stay Model, Type of Multilevel Construct, and Representation in Model Testing

NDNQI RN Survey ¹ Items Selected for Model	Model Variable	Type of Multilevel Construct and Representation in Model Testing
<p>NDNQI-Adapted Nursing Work Index³ Stem: Nurses with whom I work would say: Response options: strongly agree, agree, tend to agree, tend to disagree, disagree, strongly disagree.</p>		
<u>Professional Development</u>		
1. They have career development opportunities.	Exogenous Variable Hospital level: Professional Development	Composition Emergence by Referent Shift Consensus. Aggregated to hospital level as subscale mean, then transformed into T-scores. Represented for analysis as subscale T-score.
2. They have access to regional and national conferences.		
3. They have access to active inservice programs for nurses.		
4. They have support for pursuing degrees in nursing.		
5. They have a preceptor program for newly hired RNs.		
6. They have clinical nurse specialists who provide patient care consultations.		
7. They have flexible work schedules.		
8. They have access to continuing education programs for nurses.		
9. They have opportunities for advancement.		
10. They are not satisfied with opportunities for professional development.		

Table 16 continued
 RN Survey Items Selected for the RN Workgroup Intent to Stay Model, Type of Multilevel Construct, and Representation in Model Testing

NDNQI RN Survey ¹ Items Selected for Model	Model Variable	Type of Multilevel Construct and Representation in Model Testing
<u>Supportive Nursing Management</u>		
1. Their nurse manager is a good manager and leader.	Exogenous Variable RN Workgroup level, Nurse Leadership Indicator: Satisfaction with nurse management	Composition Emergence by Referent Shift Consensus. Aggregated to unit level as subscale mean, then transformed into T-scores. Represented for analysis as subscale T-score.
2. Their nurse manager is supportive of nurses.		
3. Their nurse manager backs up the nursing staff in decision making even in conflicts with physicians.		
4. They are not satisfied with their nurse manager.		
5. Their nurse manager consults with staff on daily problems.		
<u>Nursing Administration</u>		
1. They are satisfied with the hospital chief nurse executive.	Exogenous Variable Hospital level: Satisfaction with nursing administration	Composition Emergence by Referent Shift Consensus. Aggregated to hospital level as subscale mean, transformed into T-scores. Represented for analysis as subscale T-score.
2. Their hospital chief nurse executive is equal in authority to other top-level hospital executives.		
3. Their hospital chief nurse executive is visible to staff.		
4. Their hospital chief nurse executive is equal in power to other top-level hospital executives.		
5. Their hospital chief nurse executive is accessible to staff.		

Table 16 continued
RN Survey Items Selected for the RN Workgroup Intent to Stay Model, Type of Multilevel Construct, and Representation in Model Testing

NDNQI RN Survey ¹ Items Selected for Model	Model Variable	Type of Multilevel Construct and Representation in Model Testing
<p>NDNQI-Adapted Job Enjoyment Scale⁴ Nurses with whom I work would say that they: Response options: strongly agree, agree, tend to agree, tend to disagree, disagree, strongly disagree.</p> <ol style="list-style-type: none"> 1. Are fairly well satisfied with their jobs. 2. Would not consider taking another job. 3. Have to force themselves to come to work much of the time. 4. Are enthusiastic about their work almost every day. 5. Like their jobs better than the average worker does. 6. Feel that each day on their job will never end. 7. Find real enjoyment in their work. 	Endogenous Variable RN Workgroup Job Enjoyment	Composition Emergence by Referent Shift Consensus. Aggregated to unit level as subscale mean, then transformed into T-scores. Represented for analysis as subscale T-score.
Work Contextual Items		
<p>Unit RN Job Plans for Next Year 1. What are your job plans for the next year? Response options: Stay in my current position, stay in direct patient care but in another unit in this hospital, stay in direct patient care but outside this hospital, leave direct patient care but stay in the nursing profession, leave the nursing profession for another career, retire.</p>	Outcome Variable RN Workgroup Intent to Stay	Fuzzy Emergence. Response options collapsed into 2 categories, stay in my current position (coded as 100) and all others (coded as 0), then aggregated to the unit level. Represented for analysis as % of unit RNs who selected stay in my current position.

Table 16 continued
RN Survey Items Selected for the RN Workgroup Intent to Stay Model, Type of Multilevel Construct, and Representation in Model Testing

NDNQI RN Survey ¹ Items Selected for Model	Model Variable	Type of Multilevel Construct and Representation in Model Testing
<u>Unit Orientation and Hospital Recommendation</u> 1. I received an orientation that adequately prepared me for my current position. Please indicate the degree to which you agree or disagree with the following statements: Response options: strongly agree, agree, tend to agree, tend to disagree, disagree, strongly disagree.	Exogenous Variable RN Workgroup level, Nurse Leadership Indicator: Adequacy of workgroup orientation	Composition emergence by direct consensus. Item mean is aggregated to unit level. Represented for analysis as item mean.
<u>Description of Unit Last Shift</u> 3. My patient care assignment was appropriate, considering both the number of patients and the care they required. Response options: strongly agree, agree, tend to agree, tend to disagree, disagree, strongly disagree	Exogenous Variable RN Workgroup level, Work Context Indicator: Appropriate workgroup patient assignments	Composition emergence by direct consensus. Item mean is aggregated to unit level. Represented for analysis as item mean.
<u>Situations on Unit Last Shift</u> Think about the last shift that you worked. Did any of the following situations occur? Response options: yes, no, not applicable. 2. I didn't have enough time to document care.	Exogenous Variable RN Workgroup level, Work Context Indicator: Enough time to document	Fuzzy Emergence. Response options are collapsed into 2 categories, yes (coded as 0) or no (coded as 100) (not applicable coded as missing), then aggregated to the unit level. Represented for analysis as % of unit RNs who selected no.

Table 16 continued
 RN Survey Items Selected for the RN Intent to Stay Model, Type of Multilevel Construct, and Representation in Model Testing

NDNQI RN Survey ¹ Items Selected for Model Testing	Model Variable	Type of Multilevel Construct and Representation in Model Testing
3. I had enough time to spend with each patient.	Exogenous Variable RN Workgroup level, Work Context Indicator: Enough time with patients.	Fuzzy Emergence. Response options are collapsed into 2 categories, yes (coded as 100) or no (coded as 0) (not applicable coded as missing), then aggregated to the unit level. Represented for analysis as % of unit RNs who selected yes.
4. Inadequate staffing either prevented or resulted in patient admissions, transfers, or discharges.	Exogenous Variable RN Workgroup level, Work Context Indicator: Patient flow not affected by staffing	Fuzzy Emergence. Response options are collapsed into 2 categories, yes (coded as 0) or no (coded as 100) (not applicable coded as missing), then aggregated to the unit level. Represented for analysis as % of unit RNs who selected no.
<u>Breaks on Unit Last Shift²</u>		
1. On your last shift, how many hours did you work?	Exogenous Variable RN Workgroup level, Work Context Indicator: % workgroup working <=12 hours last shift	Fuzzy Emergence. Response options are collapsed into 2 categories, ≤12 hours (coded as 100) and >12 hours (coded as 0), then aggregated to the unit level. Represented for analysis as % of unit RNs who selected ≤12 hours.
3. On your last shift, what was the total duration of your meal break(s)? Response options: ≤15 minutes, 16-30 minutes, 31-45 minutes, 46-60 minutes, 61-75 minutes, 76-90 minutes, 91-105 minutes, 106-120 minutes, >120 minutes.	Exogenous Variable RN Workgroup level, Work Context Indicator: % workgroup taking meal break	Fuzzy Emergence. Response options are collapsed into 2 categories, ≤15 minutes (coded as 0) and >15 minutes (coded as 100), then aggregated to the unit level. Represented for analysis as % of unit RNs who selected >15 minute meal break.

Table 16 continued
 RN Survey Items Selected for the RN Workgroup Intent to Stay Model, Type of Multilevel Construct, and Representation in Model Testing

NDNQI RN Survey ¹ Items Selected for Model	Model Variable	Type of Multilevel Construct and Representation in Model Testing
<p><u>Usual Shift and Shift Rotation of Unit RNs</u></p> <p>1. Which of the following best describes the shift you USUALLY work? Response options: day shift, evening shift, night shift, no USUAL shift.</p>	<p>Exogenous Variable RN Workgroup level, Workgroup diversity: Workgroup shift worked</p>	<p>Compilation emergence by variance. Response options are collapsed into 2 categories, day shift (coded as 100) and all others (coded as 0), then aggregated to the unit level. Represented for analysis as a variance index of unit RNs who selected day shift.</p>
<p>2. Which of the following best describes your USUAL shift rotation? Response options: I do not usually rotate; I rotate between day and evening shifts; I rotate between day and night shifts; I rotate between evening and night shifts; I rotate between day, evening, and night shifts.</p>	<p>Exogenous Variable RN Workgroup level, Workgroup diversity: Workgroup schedule rotation</p>	<p>Compilation emergence by variance. Response options collapsed into 2 categories, I do not usually rotate (coded as 100), and I rotate between any shift (coded as 0), then aggregated to the unit level. Represented for analysis as variance index of unit RNs who selected I do not usually rotate.</p>
<p>3. How much influence do you have over the hours or schedule that you work? Response options: Very little, little, moderate, much, very much</p>	<p>Exogenous Variable RN Workgroup level, Nurse Leadership Indicator: Workgroup influence in scheduling</p>	<p>Composition emergence by direct consensus. Item mean is aggregated to the unit level. Represented for analysis by item mean.</p>

Table 16 continued
RN Survey Items Selected for the RN Workgroup Intent to Stay Model, Type of Multilevel Construct, and Representation in Model Testing

NDNQI RN Survey ¹ Items Selected for Model	Model Variable	Type of Multilevel Construct and Representation in Model Testing
<p><u>Floating of Unit RNs in Last Two Weeks</u></p> <p>1. Over the last 2 weeks that you worked, how many hours did you work on a unit other than your permanently assigned unit? Response options: not assigned to a specific unit, 0-only worked on my regular unit, less than 8 hours, 8-16 hours, more than 16 hours.</p>	<p>Exogenous Variable RN Workgroup level, Work context indicator: %/workgroup not floating off unit</p>	<p>Fuzzy Emergence. Response options collapsed into 2 categories, only worked on my regular unit (coded as 100) and floated any amount of time (coded as 0) (not assigned to a specific unit coded as missing), then aggregated to the unit level. Represented for analysis as % of unit RNs who only worked on regular unit.</p>
<p><u>Unit RNs Working Extra Hours</u></p> <p>2. Over the past year, what has happened about the amount of overtime needed from RNs on your unit? Response options: increased, remained the same, decreased, don't know.</p>	<p>Exogenous Variable RN Workgroup level, Work context indicator: Change in unit overtime needs</p>	<p>Composition emergence by direct consensus. Item mean is aggregated to the unit level. Represented for analysis as item mean.</p>
<p><u>Average Unit RN Gender, Race, Age, Role, and Job Situation</u></p> <p>3. What is your age?</p>	<p>Exogenous Variable RN Workgroup level, Workgroup diversity: Workgroup age</p>	<p>Compilation emergence by variance. Mean age is aggregated to the unit level. Represented for analysis as variance index of mean age.</p>
<p><u>Average Unit RN Tenure</u></p> <p>1. How many years have you been employed as an RN on your current unit?</p>	<p>Exogenous Variable RN Workgroup level, Workgroup diversity: Workgroup unit tenure</p>	<p>Compilation emergence by variance. Mean years is aggregated to the unit level. Represented for analysis as variance index of mean years.</p>

Table 16 continued
 RN Survey Items Selected for the RN Workgroup Intent to Stay Model, Type of Multilevel Construct, and Representation in Model Testing

NDNQI RN Survey ¹ Items Selected for Model	Model Variable	Type of Multilevel Construct and Representation in Model Testing
<u>Average Unit RN Certification and Education</u> 1. Are you currently certified for specialty practice by the American Nurses Association or a national nursing specialty organization? (Do not include American Heart Association competencies, such as CPR, ACLS, or PALS, and do not include internal hospital certifications.) Response options: yes, no	Exogenous Variable RN Workgroup level, Workgroup diversity: Workgroup certification	Compilation emergence by variance. Response options yes (coded as 100) and no (coded as 0) are aggregated to the unit level. Represented for analysis as variance index of % of unit RNs who have a national nursing certification.
3. What is your highest level of nursing education? Response options: diploma, associate degree, baccalaureate degree, masters degree, doctorate degree.	Exogenous Variable RN Workgroup level, Workgroup diversity: Workgroup education	Compilation emergence by variance. Response options are collapsed into 2 categories, BSN degree or higher (coded as 100) and all others (coded as 0), then aggregated to the unit level. Represented for analysis as variance index of % of unit RNs who have a BSN degree or higher.

¹See Appendix B, 2006 NDNQI RN Survey with Job Satisfaction Scales

²NDNQI adaptation of Stamps' (1997) Index of Work Satisfaction

³NDNQI adaptation of items from Aiken & Patrician's (2000) Revised Nursing Work Index

⁴NDNQI adaptation of items from Brayfield & Rothe's (1951) Index of Job Satisfaction

⁵NDNQI adaptation of Rogers, Hwang & Scott's (2004) work break items

Table 17
Individual level NDNQL-Adapted RN Job Satisfaction Scales Cronbach's Alpha and Exploratory Factor Loadings

Subscale	Cronbach's Alpha		Factor Loadings		Cronbach's Alpha	
	Spring 2001 Data ¹ N=918 RNs	Factor Loadings	April-June 2003 Data ² N=5,749 RNs	Factor Loadings	2005 Data ³ N=109,554 RNs	2006 Data ³ N=6,417 RNs
Pay	.87	.71-.81	.88	.74-.80	.89	.88
Task	.77	.46-.76	.81	.56-.72	.85	.83
Decision-making	.79	.47-.67	.85	.50-.63	.87	.86
RN-RN Interaction	.65	.52-.75	.85	.50-.81	.86	.86
RN-MD Interaction	.85	.60-.80	.91	.70-.81	.91	.90
Autonomy	.66	.52-.75	.81	.43-.63	.81	.79
Professional Status	.49	.54-.59	.81	.40-.70	.82	.84
Professional Development	NA ⁴	NA ⁴	.87	.41-.79	.88	.88
Nursing Administration	NA ⁴	NA ⁴	.93	.60-.72	.87	.89
Nursing Management	NA ⁴	NA ⁴	.86	.65-.84	.92	.92
Job Enjoyment	.87	.70-.80	.91	.67-.71	.91	.90

¹Taunton, et al., 2004

²Ammouri, et al.

³NDNQL, 2006

⁴Not available

Table 18
Hospital and RN Workgroup NDNQI-Adapted Job Satisfaction Scales Reliability
Indices

Subscale	Cronbach's alpha	Interitem Correlation Coefficient Range	% interitem Correlation Coefficients ≥.60	Intraclass Correlation Coefficient ICC(2)
Hospital level				
Autonomy	.94	.50-.82	91%	.82
Professional Development	.93	.25-.90	51%	.84
Nursing Administration	.95	.73-.89	100%	.89
RN Workgroup level				
Pay	.95	.71-.89	100%	.85
Task	.94	.61-.85	93%	.87
Decision-making	.94	.55-.80	95%	.85
RN-RN Interaction	.94	.54-.87	87%	.83
RN-MD Interaction	.97	.74-.92	100%	.83
Professional Status	.91	.43-.82	67%	.83
Nursing Management	.97	.70-.94	100%	.88
Job Enjoyment	.97	.74-.89	100%	.87

Table 19
Hospital and RN Workgroup NDNQI-Adapted Job Satisfaction Scales Validity
Indices

Subscale	Intraclass Correlation Coefficient ICC(1)	η^2	ω^2	F ¹
Hospital level				
Autonomy	.29	.30	.29	5.60
Professional Development	.32	.32	.32	6.13
Nursing Administration	.43	.42	.41	9.38
RN Workgroup level				
Pay	.30	.27	.27	6.73
Task	.30	.29	.29	7.51
Decision-making	.25	.26	.26	6.47
RN-RN Interaction	.28	.24	.24	5.91
RN-MD Interaction	.27	.24	.24	5.91
Professional Status	.28	.24	.24	5.75
Nursing Management	.33	.32	.32	8.58
Job Enjoyment	.28	.29	.29	7.41

¹All significant at $\leq .05$

CHAPTER IV

RESULTS

Chapter IV presents the results of study aims designed to examine relationships depicted in the RN Workgroup Intent to Stay Model (Figure 1, p. 2). The study was unique in developing a multilevel model of RN workgroup intent to stay, and including RN workgroup diversity and hospital Magnet designation as predictors. The primary aim was to examine relationships depicted in the RN Workgroup Intent to Stay Model within medical units of acute care hospitals. The secondary aim was to examine the appropriateness of the workgroup level measurement model for intent to stay. Chapter IV presents results addressing the secondary aim first, because these results determine the appropriateness of pursuing the primary aim.

Secondary Aim

The secondary aim of the study was to examine the appropriateness of the fuzzy composition workgroup level measurement model for the dependent variable, intent to stay. **Reliability** was examined using the intraclass correlation coefficient **ICC(2)**, and **construct validity** was examined using the intraclass correlation coefficient **ICC(1)**, as well as **correlations** between job satisfaction variables and intent to stay at the individual and workgroup levels. Although intent to stay is a dichotomous variable, intraclass correlations were calculated using ANOVA based formulas. Ridout, Demetrio, and Firth (1999, cited in Turner, Omar, & Thompson, 2006) conclude that the normality assumption is not required for validity of ICC

estimates, allowing the use of ANOVA procedures. Table 20 (p. 172) presents intraclass correlations, ICC(2) and ICC(1), for samples drawn from the 2006 RN Survey. Samples range from 7,564 units of all unit types with a response rate of 50%, to samples limited to medical units. Medical unit samples range in response rates from 50% to 90%, and in sample size from 551 units to 113 units.

Reliability

ICC(2) values provide an estimate of the consistency of the group mean when individual level data are aggregated. Reliable group-mean values, evidenced by high ICC(2) values, are the key to detecting emergent relationships regardless of the type of variable being aggregated (Bliese, 2000). Glick (1985) suggested .60 as the acceptance criteria for ICC(2). The ICC(2) value for the study sample demonstrates acceptable group-level reliability at .586, rounding to .60 (see Table 20, p. 172). Samples with 245 units or more exhibited acceptable reliability, with ICC(2) values of .570 or greater. The ICC(2) values of .537 and .521 were likely related to small the sample sizes of 164 and 113 units, respectively,

Validity

According to Bliese (2000), ICC(1) provides an index of the degree that individual responses are influenced by group membership, or construct validity, when applied to a model's dependent variable. Bliese introduces a ICC(1) criterion for fuzzy composition construct validity, stating that fuzzy composition exists when ICC(1) values are larger than 0. ICC(1) values for intent to stay range from .047 to .073 (see Table 20, p. 172). The ICC(1) value for the study sample demonstrates

acceptable validity at .064 for intent to stay as a group-level measure. Further support for the validity of intent to stay as a group-level measure is provided by the significant $F(2.41)$ and η^2 of .110.

Table 21 (p. 173) presents zero-order correlations of intent to stay with job enjoyment and job satisfaction subscales at both the individual and workgroup levels. In fuzzy composition, correlations of higher-level constructs are likely to reveal substantially greater relationships at the aggregated level than exist at the individual level (Bliese, 2000). Workgroup level correlations are consistently higher than individual level correlations, providing further support for construct validity of the group-level intent to stay measure. For instance, the correlation coefficient of intent to stay with task increased from .274 at the individual level to .531 at the unit level. The lowest increase was in the correlation coefficient of intent to stay with decision-making, from .305 at the individual level to .455 at the unit level.

Primary Aim

The primary aim of the study was to examine relationships depicted in the RN Workgroup Intent to Stay Model (Figure 1, p. 2) within medical units. Variables in the conceptual model were examined prior to inclusion in model testing. Linear mixed modeling procedures were used to examine model relationships. The results of the variable selection process are described below, followed by results of model testing.

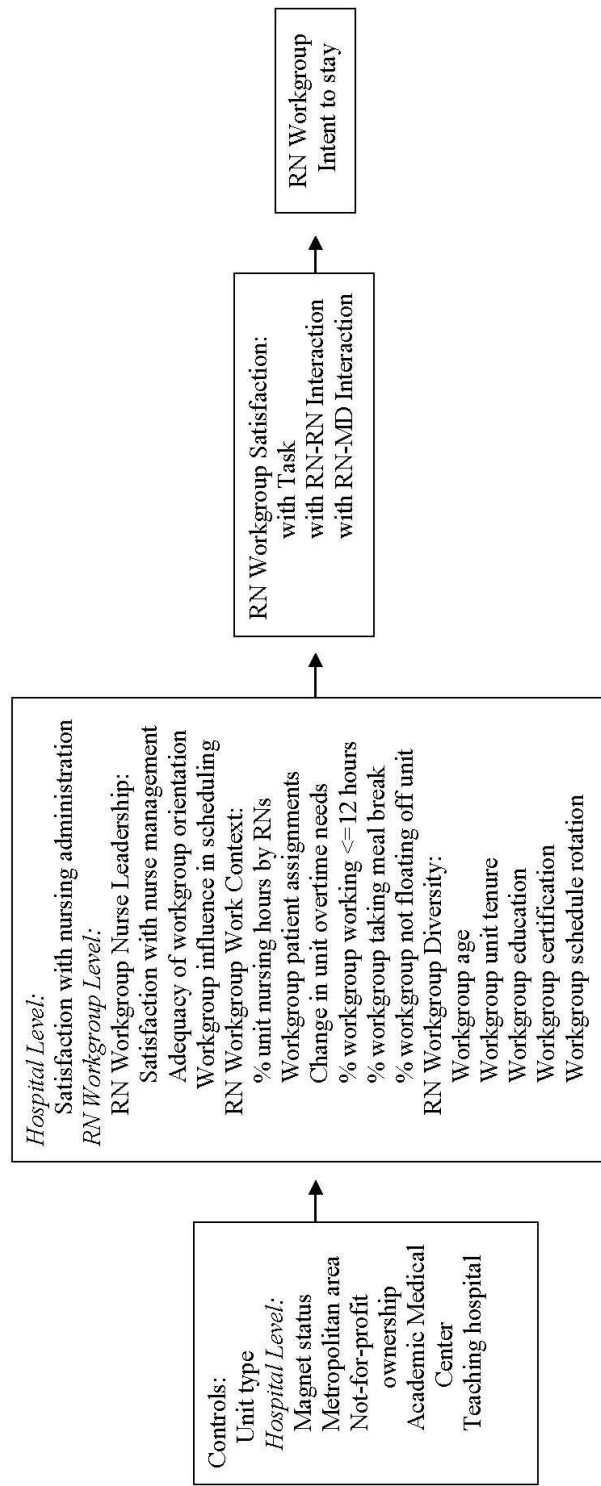
Selection of Model Variables Tested

Conceptual model variables (see Figure 1, p. 2) were examined for potential multicollinearity concerns and lack of relationship with the dependent variable, RN workgroup intent to stay. The average or variance value and standard deviation of conceptual model variables are presented in Table 22 (p. 174). Figure 5 (p. 162) illustrates the model after selection of variables to be tested.

Zero-order correlations among predictor variables were performed to check for multicollinearity. A number of predictor variables exhibited correlations greater than .50, the criterion set for an acceptable correlation for this study to address the possibility of multicollinearity. Among exogenous variables, the three hospital level variables, i.e., hospital RN satisfaction with nurse administration, professional development, and autonomy, were highly correlated ($r=.65-.69$). Hospital RN satisfaction with nursing administration was felt to be the best conceptual fit with the model, as most intuitively representing a hospital level phenomenon. Because none of the zero-order correlations among RN workgroup nurse leadership variables or between RN workgroup nurse leadership variables with other model variables exhibited associations stronger than $r=.35$, none were eliminated.

Correlations were found among RN workgroup work context variables that required eliminating variables. Workgroup work context variables included workgroup skill mix (i.e., percent of unit nursing hours supplied by RNs) and two measures of RN workload (i.e., unit patient-to-RN ratio and rating of appropriate RN workgroup patient assignment). As expected, unit skill mix and patient-to-RN ratio

Figure 5
RN Workgroup Intent to Stay Model Tested



were highly correlated ($r=-.74$), reflecting the work context of nursing units in which the higher the percent of care delivered by RNs, the lower the patient-to-RN ratio must be to meet patient care needs. Appropriate RN workgroup patient assignment was not highly correlated with skill mix ($r=.16$). Nor was appropriate RN workgroup patient assignment highly correlated with the objective workload measure of unit patient-to-RN ratio ($r=-.19$), supporting the notion that unit RN workload represents a complex phenomenon not adequately captured by unit patient-to-RN ratios. For this reason, unit patient-to-RN ratio was eliminated, while appropriate RN workgroup patient assignment and unit skill mix were retained. Percent of workgroup RNs who had enough time with patients, time to document, and who agreed that patient flow was not affected by staffing last shift, which were highly correlated with appropriate RN workgroup patient assignments ($r=.49-.75$), were also eliminated. Other workgroup work context variables (i.e., change in unit overtime needs, and % of workgroup RNs working ≤ 12 hours, taking meal break, and not floating off unit) were not highly correlated with other model variables ($.01-.31$).

None of the zero-order correlations among workgroup demographic diversity variables or between workgroup diversity variables and other exogenous variables exhibited associations stronger than $r=.22$. No workgroup diversity variable was eliminated due to multicollinearity concerns.

Zero-order correlations of exogenous variables with intervening RN workgroup job satisfaction subscales, and among RN workgroup job satisfaction subscales were also examined. High correlations ($r=.54$ to $.88$) were found among

RN workgroup job enjoyment and RN workgroup satisfaction with decision-making and professional status. In addition, high correlations ($r=.50-.72$) were found between these three variables and hospital RN satisfaction with nurse administration, RN workgroup satisfaction with nurse management, adequacy of RN workgroup orientation, and appropriate RN workgroup patient assignment. The decision was made to retain RN workgroup satisfaction with task, RN-RN interaction, and RN-MD interaction, which addressed all concerns regarding multicollinearity, with the exception of the correlation of RN workgroup satisfaction with task and appropriate RN workgroup patient assignments ($r=.80$). Because RN workgroup satisfaction with task and appropriate RN workgroup patient assignment were in separate stages of this multistage model, the decision was made to retain both variables despite the high correlation. An alternative option, to limit the RN workgroup job satisfaction scales to job enjoyment was not chosen. RN workgroup satisfaction with task, because the scale items are specific to RN tasks, was deemed a better conceptual fit with the RN Intent to Stay Model than job enjoyment, a scale developed for any occupation. In addition, job enjoyment raised additional multicollinearity concerns, as it was highly correlated with a number of variables, including RN workgroup satisfaction with RN-RN interaction, RN-MD interaction, and nurse management, as well as the adequacy of RN workgroup orientation and appropriate RN workgroup patient assignments.

All zero-order correlations among the hospital control variables and between the control variables and all other model variables were less than .40, with the exception of number of beds and teaching status ($r=.58$). The decision was made to

eliminate number of beds, which was felt to be the less conceptually important variable.

We examined zero-order correlation coefficients between the dependent variable, RN workgroup intent to stay, and all other model variables to identify variables with no correlation to the outcome. RN workgroup diversity in shift worked, which was not correlated with intent to stay, was eliminated.

Results of Linear Mixed Model Analysis

The results of four separate linear mixed model analyses are presented below. The dependent variables of the four linear mixed models included the intervening RN workgroup job satisfaction subscale retained (task, RN-RN interaction, RN-MD interaction), and the model dependent variable RN workgroup intent to stay (see Figure 5, p. 162).

Evaluation of Model Fit

The Bayesian Information Criterion (BIC) fit indices for each model analysis are presented in Table 23 (p. 175). In all cases, the BIC values for the full model of each analysis were significantly smaller than the BIC fit indices for the corresponding null model, indicating that each full model predicts the dependent model variable significantly better than the null model. The lowest BIC value is found in the model predicting RN workgroup satisfaction with task, indicating it is the model with the best fit.

RN Workgroup Satisfaction with Task

The pseudo R^2 indicated that 76% of the variance in RN workgroup satisfaction with task was predicted by this model. Significant predictors of RN workgroup satisfaction with task included the hospital level variable satisfaction with nurse administration, and RN workgroup level nurse leadership and work context variables (see Table 23, p. 175). A higher rating of satisfaction with nursing administration by all RNs across the hospital predicted a higher level of RN workgroup satisfaction with task. Higher ratings of each RN workgroup nurse leadership variable, i.e., RN workgroup satisfaction with nurse management, adequacy of RN workgroup orientation, and RN workgroup influence in scheduling, predicted greater RN workgroup satisfaction with task. Of the workgroup work context variables, a higher percent of unit nursing hours supplied by RNs, rating of appropriate RN workgroup patient assignment, and percent of workgroup RNs working ≤ 12 hours last shift predicted greater RN workgroup satisfaction with task.

RN Workgroup Satisfaction with RN-RN Interaction

The pseudo R^2 indicated that 59% of the variance in workgroup satisfaction with RN-RN interactions was predicted by this model. Significant predictors of RN workgroup satisfaction with RN-RN interactions included RN workgroup nurse leadership and work context variables (see Table 23, p. 175). A higher rating of RN workgroup satisfaction with nurse management and adequacy of RN workgroup orientation predicted higher RN workgroup satisfaction with RN-RN interaction. A higher percent of unit nursing hours supplied by RNs, rating of appropriate RN

workgroup patient assignment, and percent of workgroup RNs not floating off the unit predicted higher RN workgroup satisfaction with RN-RN interaction. A higher percent of workgroup RNs working \leq 12 hours last shift predicted lower RN workgroup satisfaction with RN-RN interactions.

RN Workgroup Satisfaction with RN-MD Interaction

The pseudo R^2 indicated that 60% of the variance in RN workgroup satisfaction with RN-MD interactions was predicted by this model. Significant predictors of RN workgroup satisfaction with RN-MD interactions included the hospital level RN satisfaction with nurse administration, as well as RN workgroup nurse leadership and work context variables (see Table 23, p. 175). Higher levels of RN workgroup satisfaction with RN-MD interaction were predicted by greater hospital level ratings of RN satisfaction with nurse administration, as well as greater RN workgroup satisfaction with nurse management, adequacy of RN workgroup orientation, and appropriate RN workgroup patient assignments.

RN Workgroup Intent to Stay

The pseudo R^2 indicated that 56% of the variance in RN workgroup intent to stay was predicted by this model. RN workgroup intent to stay was predicted by an intervening RN workgroup job satisfaction variable, task, as well as several RN workgroup exogenous variables, including RN workgroup nurse leadership, workgroup work context, and workgroup demographic diversity variables (see Table 23, p. 175). Higher levels of RN workgroup satisfaction with task and nurse management predicted RN workgroup intent to stay. Higher workgroup ratings of

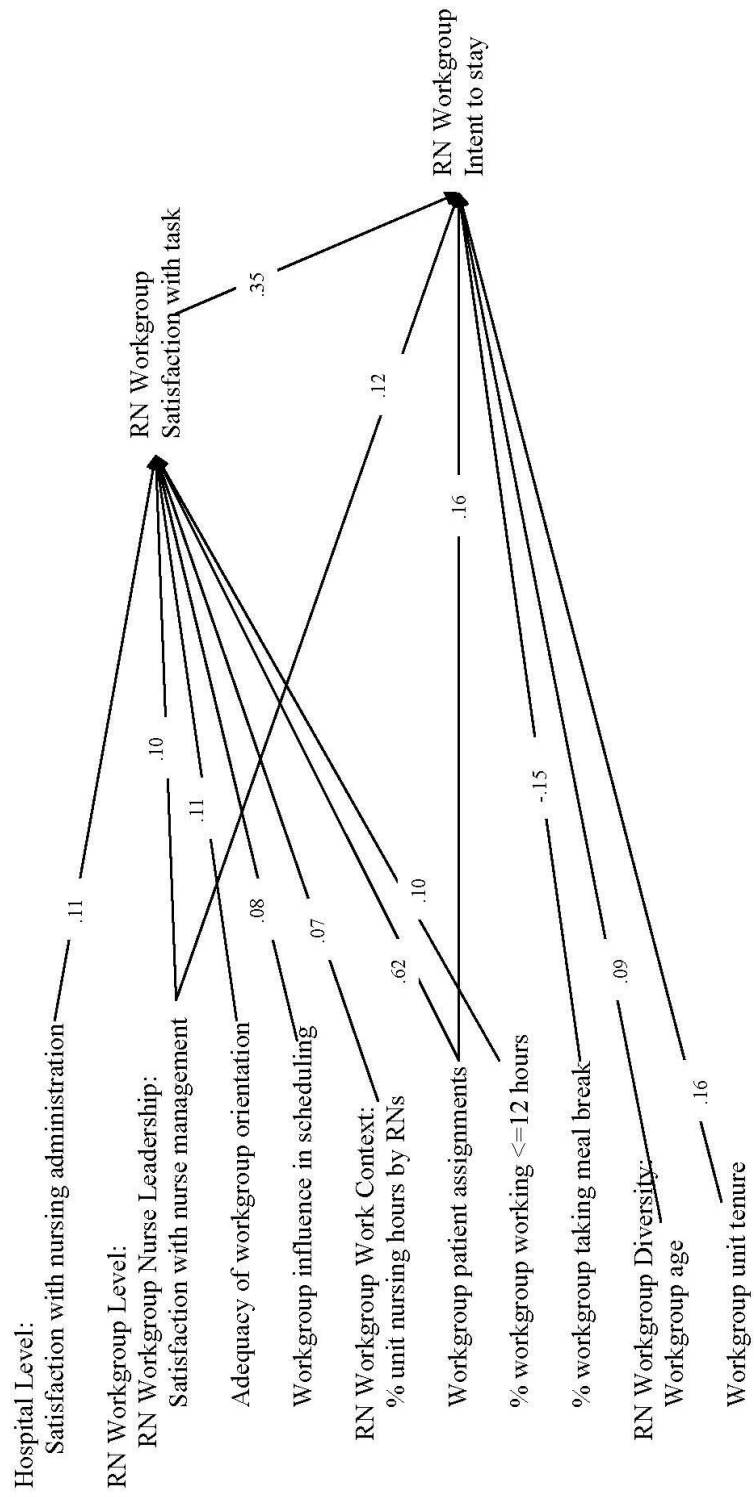
appropriate RN workgroup patient assignments predicted greater RN workgroup intend to stay, whereas a greater percent of workgroup RNs taking a meal break predicted lower RN workgroup intend to stay. Of the RN workgroup demographic diversity variables, greater RN workgroup diversity of age and unit tenure predicted greater RN workgroup intend to stay.

Standardized Model Effects

Table 24 (p. 176) presents standardized direct predictor effects on RN workgroup satisfaction with task, which are also illustrated in Figure 6 (p. 169). Hospital level and RN workgroup nurse leadership and work context variables had direct effects on RN workgroup satisfaction with task. Of these, appropriate RN workgroup patient assignments had the greatest impact. Variables with smaller direct effects, listed in order of effect size, included hospital RN satisfaction with nurse administration and adequacy of RN workgroup orientation, RN workgroup satisfaction with nurse management and percent of workgroup RNs working 12 hours or more, RN workgroup influence in scheduling, and percent of unit nursing hours supplied by RNs.

Table 24 (p. 176) presents direct, indirect, and total predictor effects on RN workgroup intent to stay, whereas direct effects are illustrated in Figure 6 (p. 169). RN workgroup satisfaction with task and nurse management, as well as RN workgroup work context and workgroup diversity variables had direct effects on RN workgroup intent to stay. Of these, RN workgroup satisfaction with task had the greatest impact. Variables with smaller direct effects, listed in order of effect size,

Figure 6
Direct Standardized Effects for Model Variables in Medical Units



included appropriate RN workgroup patient assignments, workgroup diversity in unit tenure, percent of workgroup RNs taking meal breaks, RN workgroup satisfaction with nurse management, and RN workgroup diversity in age.

Satisfaction of hospital RNs with nurse administration, as well as several RN workgroup nurse leadership and RN workgroup work context variables had indirect effects on RN workgroup intent to stay (see Table 24, p. 176). Ratings of appropriate RN workgroup patient assignments had the greatest impact, while the indirect effects of other model variables were quite small.

The greatest total effects on RN workgroup intent to stay were from the variables appropriate RN workgroup patient assignments and RN workgroup satisfaction with task (see Table 24, p. 176). Other variables with important impact, listed in order of effect size, included RN workgroup diversity in unit tenure, RN workgroup satisfaction with nurse management, percent of workgroup RNs taking a meal break, and RN workgroup diversity in age.

Effects of Control Variables

Hospital control variables exhibited effects on RN workgroup satisfaction with task and RN-RN interaction, as well as RN workgroup intent to stay (see Table 23, p. 175). Magnet designation predicted lower levels of RN workgroup satisfaction with task. Hospital location in a metropolitan area predicted higher RN workgroup satisfaction with RN-RN interaction and higher RN workgroup intent to stay, whereas academic medical center predicted lower RN workgroup intent to stay. These results are also reflected in Table 24 (p. 176), showing direct and indirect effects of

hospital controls on RN workgroup intent to stay. The direct effect of academic medical centers on RN workgroup intent to stay was negative, while the direct effect of metropolitan area was positive. Magnet designation had a small, indirect, and negative effect on RN workgroup intent to stay.

Summary

In Chapter IV, I described the results for study aims designed to examine relationships depicted in the RN Workgroup Intent to Stay Model (Figure 5, p. 162). Results of the secondary aim indicated that the workgroup level measurement model was an appropriate model for intent to stay, with support for reliability and validity. These results allowed me to pursue the primary aim, to examine the relationships depicted in the RN Workgroup Intent to Stay Model. The study was unique in developing a multilevel model of RN workgroup intent to stay that included RN workgroup diversity and hospital Magnet designation as predictors. In Chapter V, I present a discussion of the results, including the implications of the findings and recommendations for future research.

Table 20
RN Workgroup Intent to Stay ICC(2) and ICC(1)

	Response Rate	ICC(2)	Number of Units	K	ICC(1)	Eta2	F*
All Units	50%	.598	7,564	17.84	.073	.124	2.49
All Medical Units	50%	.570	551	19.31	.061	.121	2.32
Medical Units in Satisfaction Survey	50%	.586	373	19.71	.064	.110	2.41
Medical Units in Satisfaction Survey	60%	.596	316	20.51	.064	.108	2.47
Medical Units in Satisfaction Survey	70%	.590	245	21.31	.061	.103	2.44
Medical Units in Satisfaction Survey	80%	.537	164	21.53	.049	.091	2.16
Medical Units in Satisfaction Survey	90%	.521	113	21.11	.047	.090	2.09

*p<.001

Table 21
 Zero-order Correlations of Individual and RN Workgroup Intent to Stay with
 Individual and RN Workgroup Job Enjoyment and Job Satisfaction Subscale Scores

	Individual Correlation Coefficient*	RN Workgroup Correlation Coefficient*
Job Enjoyment	.400	.651
Satisfaction with:		
RN-RN Interactions	.260	.403
RN-MD Interactions	.217	.361
Task	.274	.531
Autonomy	.285	.504
Decision-making	.305	.455
Professional Status	.327	.549

*all correlations significant at the .01 level of significance

Table 22
Average or Variance Value of Conceptual Model Variables

Conceptual Model Variable	Value (SD)
Dependent Variable	
% Workgroup RNs who intend to stay on unit next year	69.76 (15.82)
Endogenous Variables	
RN Workgroup level	
Job enjoyment T-score	50.07 (07.40)
Satisfaction with task T-score	42.06 (07.21)
Satisfaction with RN-RN interaction T-score	65.87 (07.61)
Satisfaction with RN-MD interaction T-score	56.99 (06.80)
Satisfaction with decision-making T-score	47.60 (07.73)
Satisfaction with professional status T-score	63.86 (07.88)
Exogenous Variables	
Hospital level	
Satisfaction with nursing administration T-score	54.37 (05.90)
Satisfaction with professional development T-score	64.34 (05.45)
Satisfaction with autonomy T-score	49.93 (05.29)
RN Workgroup level	
RN Workgroup Nurse leadership	
Satisfaction with nurse management T-score	57.71 (07.29)
Adequacy of workgroup orientation (1=strongly disagree, 6=strongly agree)	04.68 (00.39)
Workgroup influence in scheduling (1=very little, 4=very much)	03.26 (00.53)
RN Workgroup Work Context	
Unit Patient-to-RN ratio	04.85 (01.33)
% Unit nursing hours by RNs	63.45 (10.15)
Appropriate workgroup patient assignment(1=strongly disagree, 6=strongly agree)	04.01 (00.52)
Change in unit overtime needs over past year (-1=decreased, +1=increased)	00.30 (00.44)
% Workgroup who had enough time with patients last shift	42.47 (19.21)
% Workgroup who had enough time to document last shift	59.44 (15.40)
% Workgroup who agreed patient flow not affected by staffing last shift	67.56 (18.79)
% Workgroup working <=12 hours last shift	79.83 (18.97)
% Workgroup taking meal break last shift	66.52 (20.30)
% Workgroup not floating off unit last 2 weeks	77.01 (19.11)
RN Workgroup Diversity	
Workgroup age	109.55(40.86)
Workgroup unit tenure	30.64 (24.39)
Workgroup education	00.21 (00.05)
Workgroup certification	00.18 (00.07)
Workgroup shift worked	00.23 (00.02)
Workgroup schedule rotation	00.12 (00.09)

Table 23
Results for Linear Mixed Model Analysis of RN Workgroup Intent to Stay Model

Variables	Satisfaction with task		RN-RN interaction		RN-MD interaction		Intent to stay	
	Estimate	T	Estimate	T	Estimate	T	Estimate	T
RN Workgroup Intervening Variables:								
Satisfaction with task							.77	4.32
Satisfaction with RN-RN interaction								.000
Satisfaction with RN-MD interaction								
Exogenous Variables:								
<i>Hospital level:</i>								
Satisfaction with nurse administration	.14	3.01	.003		.15	2.11	.037	
<i>RN Workgroup level:</i>								
RN Workgroup Nurse Leadership:								
Satisfaction with nurse management	.10	2.67	.008	.31	6.29	.000	.17	3.49
Adequacy of workgroup orientation	2.07	3.10	.002	5.18	5.54	.000	3.26	3.54
Workgroup influence in scheduling	1.05	2.17	.031					
RN Workgroup Work Context:								
%Unit nursing hours by RNs	4.90	1.92	.057	9.39	2.59	.010		
Workgroup patient assignments	8.56	15.46	.000	3.43	4.43	.000	3.06	4.02
Change in unit overtime needs								
%workgroup working <=12 hours	.04	2.51	.013	-.06	-2.94	.004		
%workgroup taking meal break								
%workgroup not floating off unit				.05	2.85	.005		
RN Workgroup Diversity:								
Workgroup age								
Workgroup unit tenure							.04	2.08
Workgroup education							.10	3.41
Workgroup certification								
Workgroup shift worked								
Workgroup schedule rotation								
Hospital level Controls:								
Magnet designation								
Metropolitan area	-1.16	-2.07	.041	3.03	2.04	.043	6.83	2.12
Not-for-profit ownership								
Academic Medical Center								
Teaching hospital								
Null model BIC	2523.335			2571.827			2469.476	
Full model BIC	1881.335			2090.392			2084.333	
Model difference test statistic	642, df=20*			481.435, df=20*			385.143, df=20*	
							548.241, df=23*	

*Significant at $p \leq .001$

Table 24
Standardized Direct Effects on Satisfaction with Task, and Direct, Indirect, and Total
Effects on Intent to Stay

	Satisfaction	Intent to stay		
	with task	Direct	Indirect	Total
	Direct	Direct	Indirect	Total
	Effects	Effects	Effects	Effects
RN Workgroup Intervening Variables				
Satisfaction with task		.35		.35
Satisfaction with RN-RN interaction				
Satisfaction with RN-MD interaction				
Exogenous Variables				
<i>Hospital level:</i>				
Satisfaction with nurse administration	.11		.04	.04
<i>RN Workgroup level:</i>				
RN Workgroup Nurse Leadership:				
Satisfaction with nurse management	.10	.12	.03	.15
Adequacy of workgroup orientation	.11		.04	.04
Workgroup influence in scheduling	.08		.03	.03
RN Workgroup Work Context:				
% unit nursing hours by RNs	.07		.02	.02
Workgroup patient assignments	.62	.16	.22	.38
Change in unit overtime needs				
%workgroup working <=12 hours	.10		.03	.03
%workgroup taking meal break		-.15		-.15
%workgroup not floating off unit				
RN Workgroup Diversity:				
Age		.09		.09
Unit tenure		.16		.16
Education				
Certification				
Shift worked				
Schedule rotation				
Hospital level Controls:				
Magnet designation	-.08		-.03	-.03
Metropolitan area		.10		.10
Not-for-profit ownership				
Academic Medical Center		-.17		-.17
Teaching Hospital				

CHAPTER V

DISCUSSION

Chapter V presents a discussion of the findings of the study aims, the utility of the model, and the contribution to nursing job intention research. The primary aim of this study was to examine relationships depicted in the RN Workgroup Intent to Stay Model (Figure 5, p. 162) within medical units. The secondary aim was to examine the appropriateness of a workgroup level measurement model for intent to stay. Unique aspects of the study include developing a multilevel model, exploring intent to stay as a workgroup level construct, and including measures of RN workgroup diversity and Magnet designation as determinants. An understanding of how predictors of RN workgroup intent to stay on the unit vary by unit type is essential for developing the targeted retention strategies which are an important component of efforts to address the evolving nursing shortage.

Significance of Study

The evolving shortage of RNs in the United States, in the view of leading nursing workforce researchers, is of a magnitude that “not only will decrease access to care but will cripple the health care system” (Buerhaus et al., 2002, p. 125). Driving this shortage are an increasing demand for nurses by a population that is aging rapidly, a decreasing supply of nurses, and a dissatisfying work environment. The supply of nurses is decreasing because the current nursing workforce is aging rapidly, while fewer are entering the workforce. Those that enter the workforce are rapidly leaving because of the dissatisfying work environment. Efforts to address

these trends require an unparalleled focus on nurse retention, in addition to the traditional concentration on recruitment.

The causal order of RN job satisfaction as the best predictor of job intention, which in turn is the best predictor of turnover, is well supported empirically. Identifying factors that affect RN workgroup job satisfaction and RN workgroup job intention may provide the foundation needed to develop effective retention interventions. Based on evidence that RN workgroup job satisfaction varies across different types of nursing units within hospitals (Boyle et al., 2006), it is likely that interventions to increase RN workgroup job satisfaction and RN workgroup intent to stay will be most effective if they can be targeted to RN workgroups on specific types of nursing units. By examining intent to stay among workgroups on medical units, this study begins to bridge the gap in our understanding how determinants of RN workgroup intent to stay vary by unit type, knowledge which is needed to support the development of targeted retention efforts.

Literature Review Update

Since the literature reported in Chapter II was reviewed, an additional model has been added to this body of research. Using secondary analysis, Stone, Larson, Mooney-Kane, Lin, and Dick (2006) tested an individual RN-level model predicting intent to leave using a sample of 837 RNs in 39 ICUs in 23 hospitals. The effects of exogenous variables were tested on organizational climate and intent to leave. The most important predictor of intent to leave was organizational climate, and the most important predictor of organizational climate was Magnet designation. Interestingly,

Magnet designation did not affect intent to leave, and work context indicators, including nursing hours per patient day, did not affect either organizational climate or intent to leave. Stone et al.'s model did not include nurse management or RN job satisfaction indicators.

Interpretation of Results

The primary aim of the study was to examine relationships depicted in the RN Workgroup Intent to Stay Model (Figure 5, p. 162) within medical units. The study model extends the work of previous researchers by conceptualizing intent to stay as a group-level phenomenon that is influenced by hospital Magnet designation and RN workgroup diversity. Advancing the model required an initial examination of the validity of intent to stay as a workgroup level construct, the secondary study aim.

Secondary Aim

The secondary aim of the study was to examine the appropriateness of the fuzzy composition workgroup level measurement model for the dependent variable, intent to stay. Reliability was examined using the intraclass correlation coefficient ICC(2), and construct validity was examined using the intraclass correlation coefficient ICC(1), as well as correlations between job satisfaction variables and intent to stay at the individual and workgroup levels.

Group-mean reliability ICC(2) analysis of RN workgroup intent to stay on the unit exhibited acceptable reliability in all samples tested with 245 units or more. Because the ICC(2) value for units with greater than 5 responses and greater than or equal to 50 percent response rate, which included a sample size of 7,564 units, was

.598 [easily rounding to Glick's (1985) acceptable criteria of .60], the lower ICC(2) for the 373 medical units in the study sample may be related to sample size. Group-mean ICC(1) analysis of RN workgroup intent to stay exhibited acceptable construct validity, which was further supported by greater correlation coefficients at the workgroup level than the individual level of intent to stay with job enjoyment and job satisfaction subscales. In fuzzy composition, correlations of higher-level constructs are likely to reveal substantially greater relationships at the aggregated level than exist at the individual level (Bliese, 2000).

The analysis supports the use of RN workgroup intent to stay as an emergent workgroup level construct. In this view, RN workgroup intent to stay originates in the cognition, affect, and attitudes of individual RNs, which then are amplified by interactions among individual RNs before being manifested as workgroup level collective phenomena.

The organizational theorists Kozlowski & Klein (2000) viewed construct emergence from the perspective of theories of chaos, self-organization, and complexity. From this perspective, the focus on emergence shifts from the process of composition to a more nuanced continuum extending from isomorphism to discontinuity. RN workgroup intent to stay is conceptualized in the middle of this continuum. As a group-level phenomenon, it is not considered identical to individual RN intent to stay, as in composition emergence, or different from individual RN intent to stay, as in compilation emergence. Instead, RN workgroup intent to stay is conceptualized as a complex, fuzzy emergent construct, both related to and different

from individual RN intent to stay. Contributions from individual RNs are pooled, without regard to differences in the amount of their contributions. Individual RN intent to stay indicates a dichotomous presence or absence of an attitude that can be influenced by just a few individuals. RN workgroup intent to stay contains higher level contextual influences not captured by the intent to stay of individual RNs, and therefore allows the detection of workgroup level relationships not apparent at the individual level.

As a fuzzy emergent construct, RN workgroup intent to stay includes contextual workgroup influences and unique individual contributions. Contextual workgroup contributions can include consensus regarding job satisfaction and perceptions of the practice environment, or a snowball effect of increasing unit turnover rates. Individual RN contributions can include age, education, unit tenure, professional goals, family responsibilities, or interactions with dyads and networks both within and outside the unit.

The RN Workgroup Intent to Stay Model (Figure 5, p. 162) is unique in viewing RN workgroup intent to stay as an emergent, group-level construct. Only two unit level intent to stay models were found in the literature. Price and Mueller (1981) included intent to stay as a dependent variable in their unit level analysis, but did not discuss unit level psychometric properties. Leveck and Jones (1996) did not include intent to stay in their unit level model because they considered it to be an individual level construct.

A valid workgroup level measure of nursing intent to stay contributes importantly to the advancement of nursing job intention and turnover research by supporting progress from testing conceptual models to targeted interventional studies. The causal order of job satisfaction as the best predictor of intent to stay, which in turn is the best predictor of retention or turnover is well supported. Intent to stay has important advantages over turnover as an outcome measure for interventional research, which includes avoiding unresolved measurement issues surrounding administrative turnover data, offering predictors that are better understood, and, perhaps most importantly, supporting interventions that target nurses before they actually leave. In addition, important differences have been found among nursing care units in RN workgroup job satisfaction (Boyle et al., 2006) and vacancy rates (AONE, 2002). A workgroup measure enables the examination of nursing care unit differences in intent to stay. Retention interventions that are targeted to RN workgroups in specific types of units are likely to be most effective at improving RN job satisfaction and intent to stay.

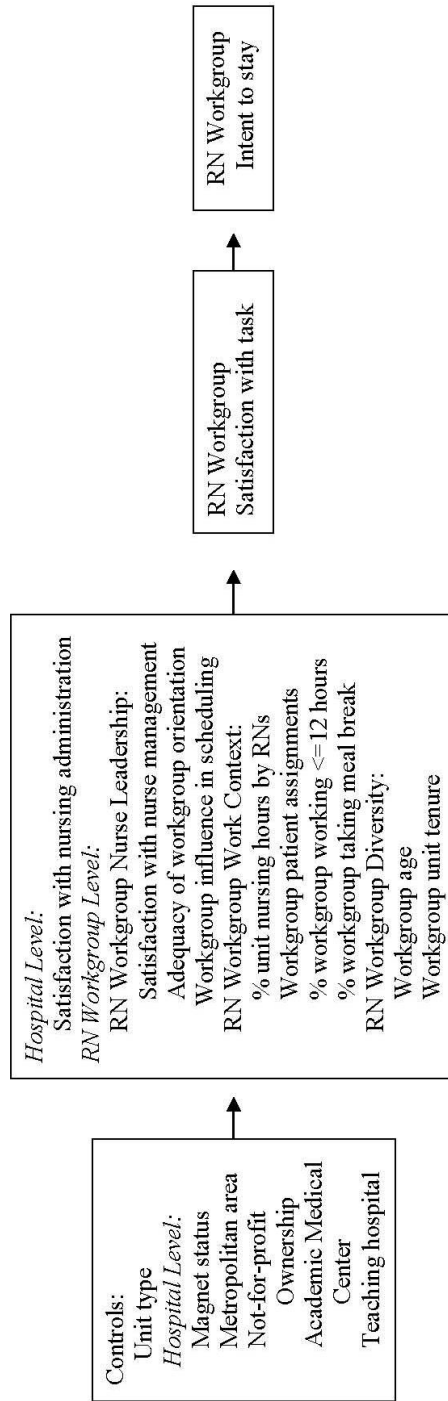
Primary Aim

The primary aim of the study was to examine relationships depicted in the RN Workgroup Intent to Stay Model (Figure 5, p. 162). The results of model testing are illustrated in Figure 7 (p. 183), the revised model for medical units.

Determinants of RN Workgroup Satisfaction with Task

As predicted, the hospital level variable satisfaction with nurse administration, as well as RN workgroup nurse leadership and workgroup work context variables had

Figure 7
Revised RN Workgroup Intent to Stay Model for Medical Units



important effects on RN workgroup satisfaction with task. The most important predictor of RN workgroup satisfaction with task was appropriate workgroup patient assignments, with a standardized direct effect of .62 (see Table 24, p. 176). To place the magnitude of this increase in task T-score in perspective, it may be helpful to recall that the RN workgroup average satisfaction with task T-score for medical units in this study was 42.06, with a standard deviation of 7.21 (see Table 22, p. 174). For every increase of one in the 6-point rating scale of appropriate RN workgroup assignments, an RN workgroup's satisfaction with task T-score will increase 8.56, which is greater than a standard deviation (see Table 23, p. 175).

The effect of a rating of appropriate patient assignments on job satisfaction had not been tested previously in nursing job intention models. Weisman et al. (1981a), using nurse-to-patient ratio, an objective workload variable, found higher workloads associated with lower ratings on a composite measure of job satisfaction, although this variable had much less relative importance in Weisman et al.'s model.

Satisfaction with task items focus on RN workgroup perceptions of patient care activities, primarily on perceptions of time available for direct patient care (see Table 16, p. 143). For instance, workgroup RNs rate the amount of time for direct patient care, time to discuss patient care problems with other nursing service personnel, and the degree to which they could deliver better care if they had more time with each patient. It is a very intuitive finding that a rating of the appropriateness of workgroup patient assignments strongly predict RN workgroup satisfaction with time available for direct patient care.

Other variables with a direct effect on RN workgroup satisfaction with task exhibit a smaller level of impact, with standardized direct effects ranging from .07 to .11 (see Table 24, p. 176). For every increase of one T-score in hospital RN satisfaction with nurse administration or RN workgroup satisfaction with nurse management, a workgroup's satisfaction with task T-score will increase .14 and .10, respectively (see Table 23, p. 175). While a hospital level rating of RN satisfaction with nursing administration has not been included in previous models to predict other dimensions of RN job satisfaction, the ability of perceptions of unit manager leadership to predict job satisfaction in comprehensive RN job intention models is well supported (Bott et al., 1993; Boyle et al., 1999; Decker, 1985; Leveck & Jones, 1996; Taunton et al., 1997; Weisman et al., 1981a).

Ratings of adequacy of workgroup orientation, workgroup influence in scheduling, and percent of workgroup RNs working less than or equal to 12 hours last shift are actionable variables unique to the RN Workgroup Intent to Stay Model (Figure 7, p. 183). For every increase of one on the 6-point adequacy of workgroup orientation rating scale, or the 4-point workgroup influence in scheduling rating scale, or every percent increase in workgroup RNs working less than or equal to 12 hours last shift, an RN workgroup's satisfaction with task T-score will increase 2.07, 1.05, or .04, respectively.

Contrary to predictions, several RN workgroup variables had no effect on RN workgroup satisfaction with task. RN workgroup work context variables that had no effect included percent of workgroup RNs taking a meal break, percent of workgroup

RNs not floating off the unit, and change in unit overtime needs. In addition, no effect was found in variables representing diversity in the RN workgroup. Work context and diversity variables had not been included in previously tested models.

Determinants of RN Workgroup Intent to stay

RN workgroup satisfaction with task. As predicted, the intervening variable RN workgroup satisfaction with task had a positive, direct effect on RN workgroup intent to stay (see Table 24, p. 176), and was by far the most important direct predictor. For every increase of five T-scores in RN workgroup satisfaction with task, for instance, an impressive increase of 3.85% in workgroup RNs who intend to stay on the unit in the next year will occur (see Table 23, p. 175). This finding was expected, as job satisfaction has been the most important predictor of job intention in nearly all models, whether a measure of general job satisfaction or a composite score of satisfaction with dimensions of the nursing job was tested. The only variable that has been found more important than job satisfaction has been commitment, in a few of the models that included this variable (Bott et al., 1993; Gurney et al., 1997; Lum et al., 1998, & Taunton et al., 1997).

It was not expected, and is surprising, that RN workgroup satisfaction with neither RN-RN interaction nor RN-MD interaction predicted RN workgroup intent to stay. Somewhat similar variables, such as workgroup cohesion or interpersonal relations (Alexander et al., 1998; Cox, 2001; Curry et al., 1985; Hinshaw & Atwood, 1983-1985; Lucas et al., 1993) have shown negative associations with intent to leave or anticipated turnover.

RN workgroup work context predictors. Contrary to predicted indirect effects, RN workgroup work context variables exhibited direct effects on RN workgroup intent to stay (see Table 24, p. 176). Most importantly, for every increase of one in the 6-point rating scale of appropriate workgroup patient assignments, an increase of 4.71% in RN workgroup intent to stay on the unit in the next year will occur (see Table 23, p. 175). In Alexander et al.'s (1998) RN job intention model, satisfaction with workload was found to be associated with lower intention to leave. Nurse-to-patient ratios have been related negatively to intention to leave (Weisman et al., 1981) and to turnover (Lake, 1998).

Appropriate workgroup patient assignment was the most important predictor of RN workgroup intent to stay, considering both direct and indirect effects through RN workgroup satisfaction with task (see Table 24, p. 176). Nursing workload and staffing levels are of central concern, not only to nurse satisfaction and retention, but to patient safety as well. Sochalski (2004) found nurse ratings of quality of nursing care significantly associated with their patient care workload, the number of nursing tasks left undone, medication errors, and patient falls with injuries. Aiken et al. (2002) found higher patient mortality and failure-to-rescue rates in hospitals with high patient-to-nurse ratios, as well as higher likelihood of nurse job dissatisfaction and burnout. Needleman et al. (2001) found strong and consistent relationships between nurse staffing levels and adverse patient outcomes, e.g., urinary track infection, pneumonia, length of stay, upper gastrointestinal bleeding, and shock in medical patients, and failure to rescue in surgical patients.

Interestingly, a negative relationship was found between the percent of workgroup RNs taking a meal break and RN workgroup intent to stay. For every percent increase in workgroup RNs taking a meal break, a decrease of .12% in workgroup RNs who intent to stay on the unit in the next year will occur (see Table 23, p. 175). This may indicate that workgroups that are more likely to take meal breaks are workgroups that are less committed to workgroup functioning, and less committed in terms of intent to stay. Alternatively, taking a meal break may not be considered acceptable behavior in some workgroup cultures because RNs who take meal breaks generally are not replaced during the break, leaving the workgroup with less staffing resources. Workgroups with nurses who are not accepted and who not are viewed as “good nurses” may be workgroups with lower intent to stay.

RN workgroup nurse leadership predictors. For every increase of one T-score in RN workgroup satisfaction with nurse management, an increase of .25% in RN workgroup intent to stay on the unit next year will occur (see Table 23, p. 175). Previous models have found ratings of positive unit manager leadership predicted, in addition to job satisfaction, job intention. Unit manager consideration has been found to be associated positively to greater intent to stay (Bott et al., 1993) and to unit retention (Taunton et al., 1997). Interestingly, unit management position power and work coordination has been found to be positively associated with greater intent to stay in a sample of critical care nurses (Bott et al.; Boyle et al., 1999), but not in medical-surgical, operating room, or obstetric/gynecology nurses (Bott et al.). Also, unit management structuring expectations was found to be positively associated with

greater intent to stay among medical-surgical and critical care nurses, but not among operating room or obstetric/gynecology nurses (Bott et al.).

RN workgroup diversity. Contrary to the predicted indirect effect, RN workgroup diversity exhibited direct effects on RN workgroup intent to stay (see Table 24, p. 176). For every increase of one in the workgroup diversity measures of age or unit tenure, an increase of .04% or .10% respectively will occur in RN workgroup intent to stay. This was the first job intention model to include RN demographic diversity.

In a comprehensive review of organizational demography diversity research, Williams and O'Reilly (1998) found tenure and age diversity generally resulted in higher workgroup turnover. However, they also found important moderators helped explain the overall mix of positive and negative effects reported in the demographic diversity research. In general, they found that diversity in personality and ability attributes, by increasing workgroup information, resulted in better problem solving, particularly if moderated with task interdependence. On the other hand, they found diversity in such visible attributes as ethnicity and race resulted in greater conflict, unless mediated by common workgroup goals or collective culture.

Examining diversity in RN workgroups, Chang, Hughes, and Mark (2006) theorized that the effects of nursing workgroup diversity on the group performance outcomes of patient satisfaction, met expectations for symptom management, patient falls, and medication errors, would be mediated by group cohesion and group initiative. These researchers found no direct effects between diversity and

intervening variables, although unit tenure diversity was associated with lower patient satisfaction, and education diversity was associated with fewer severe medication errors.

Workgroup diversity constructs emerge through the process of compilation, which is based on discontinuity and lies at the opposite end of the emergence continuum from composition (Kozlowski & Klein, 2000). In compilation emergence, individual level characteristics do not coalesce, but rather vary within the group, such that the configuration or pattern of characteristics emerges to characterize the group as a whole. Kozlowski and Klein attribute compilation emergence to the theories of chaos, self-organization, and complexity science. This paradigm focuses attention on aspects of reality that characterize our changing social world, such as disequilibrium and diversity, and assumes that order and organization can arise spontaneously out of disorder through a process of self-organization (Prigogine & Stengers, 1984). From this perspective, the process of compilation emergence adds nuance to the full continuum of means by which lower-level elements can create collective phenomena.

Emergence occurs in large part through social interaction, which is affected by such forces as attraction, selection, attrition, common stimuli, socialization, and sense-making. Where these forces act as constraints, they lead to stability, uniformity, and convergence, resulting in isomorphic composition constructs. On the other hand, where these forces act to expand variability, they result in discontinuous compilation constructs. Because RN workgroups on medical units work interdependently, diversity in tenure and age seems desirable. Nurses with less tenure

need experienced nurses for their knowledge of the unit, the hospital, and possibly nursing skill and experience. Those with greater tenure may benefit from the new knowledge and ideas of those just out of school, as well as their energy and desire to learn.

Effects of Control Variables

Hospital control variables exhibited effects on RN workgroup satisfaction with task and RN workgroup intent to stay (see Table 23, p. 175). Metropolitan area had a direct positive effect on RN workgroup intent to stay, while Academic Medical Center had a direct negative effect, and Magnet designation had a small, indirect negative effect. These results are similar to the findings of Hinshaw et al. (1987) that urban location was associated negatively with turnover in a sample of RNs with diplomas, and Gurney et al. (1997) that Academic Medical Centers were associated with less job satisfaction in a sample of RNs with PhDs. However, the negative effect of Magnet designation seems counter to recent findings regarding the effect of hospital Magnet designation on measures of RN job satisfaction (Brady-Schwartz, 2005; Lacey et al, 2007; Laschinger, Shamian & Thomson, 2001; Ulrich, Buerhaus, Donelan, Norman & Dittus, 2007; Ulrich, Woods, Hart, Lavandero, Leggett & Taylor, 2007; Upenicks, 2002).

Hospitals with Magnet designations tend to be large hospitals, frequently Academic Medical Centers, with higher acuity patients and demanding levels of patient care activities. RNs in these environments may have higher expectations regarding patient care, be less satisfied with the amount of time they have available

for direct patient care, or have additional responsibilities leaving less time for patient care. Academic Medical Centers, which generally are associated with schools of nursing, are places where new graduates enter the nursing profession and generate turnover as they move on to advance their careers or earn higher education. Not intending to stay, among individual RNs launching careers, could be viewed as a positive attitude.

Determinants of RN Workgroup Satisfaction with RN-RN and RN-MD Interactions

As predicted, RN workgroup nurse leadership and work context variables had important effects on RN workgroup satisfaction with RN-RN and RN-MD interaction (see Table 23, p. 175). Also as predicted, the hospital level variable satisfaction with nurse administration predicted RN workgroup satisfaction with RN-MD interaction. RN workgroup nurse leadership variables, RN workgroup satisfaction with nurse management and adequacy of RN workgroup orientation, predicted RN workgroup satisfaction with both RN-RN and RN-MD interaction, and were the most important predictors of RN-RN interaction.

Appropriate RN workgroup patient assignment was the most important predictor of RN workgroup satisfaction with RN-MD interaction, and the only work context variable with a significant effect (see Table 23, p. 175). In contrast, RN workgroup satisfaction with RN-RN interaction was predicted by additional RN workgroup work context variables, including the percent of unit nursing hours supplied by RNs, percent of workgroup working less than or equal to 12 hours last shift, and the percent of workgroup not floating off the unit.

In RN workgroups in hospitals located in metropolitan areas, the RN workgroup satisfaction with RN-RN interaction T-score will be 3.03 higher than in rural areas (see Table 23, p. 175). Hinshaw et al. (1987) found urban location associated positively with organizational job satisfaction for RNs with BA degrees, but associated negatively with professional job satisfaction for RNs who work on medical-surgical units.

Limitations

Although the RN Intent to Stay Model incorporates variables that were important in tests of previous models, errors may have occurred in model specification. Relevant variables may have been omitted from the model, either inadvertently or because they were not included in the dataset used for this secondary analysis. For instance, variables that measure other aspects of RN workgroup functioning than is measured by RN-RN interactions may be important, such as group cohesion, or perhaps hazing or bullying.

Generalizability of study findings is limited, first by the self-selected nature of the NDNQI hospital membership, which differs from a random set of all hospitals in the United States, and second by the hospital sample selected for this study. The most notable difference between the NDNQI membership and U.S. hospitals is in Magnet designation, as nearly all of the 200 plus Magnet hospitals are members of NDNQI, although large facilities, not-for-profit, and academic medical centers are also over-represented in the NDNQI membership. Hart, Gajewski, and Dunton (2006) compared NDNQI member hospitals with data from the AHA annual survey

of all hospitals in the United States. Findings indicated that large facilities, not-for-profits, and academic medical centers are over-represented in the NDNQI membership. The effect of limiting the study sample to medical units was to exclude a greater proportion of very small hospitals, specialty hospitals, and non-teaching hospitals. See Table 15 (p. 142) for a comparison of the characteristics of all hospitals in the 2006 survey with hospitals in the study sample.

Implications

The goal for the study was to refine a comprehensive model of RN workgroup intent to stay. Unit level results hold important policy implications in that unit level interventions will likely be more practical to implement and to measure effects of than individual level interventions. The study findings provide directions for strategies specifically targeted to medical unit RN workgroups. Strategies should target RN workgroup satisfaction with task, perceptions of appropriate workgroup patient assignments, RN workgroup satisfaction with nurse management, and other actionable RN workgroup work context variables.

Strategies that target appropriate workgroup patient assignments may be important for improving both RN workgroup satisfaction with task and RN workgroup intent to stay. RN workgroups who have appropriate assignments, who are able to complete their patient care without working past their 12 hour shift, and who have enough time to spend with patients, will be satisfied with the task of the job, with RN-RN or RN-MD interaction, and will be more likely to intend to stay on the unit. Hospital administrators should begin to balance the costs of increased nurse

staffing and skill mix with the costs not only of adverse patient outcomes that could be avoided by improved staffing (Needleman et al., 2006), but also the costs of nursing turnover associated with inappropriate RN workgroup assignments.

Other strategies to improve RN workgroup satisfaction with nursing tasks on medical units should target fundamental nursing work processes and the nursing work environment. *Transforming Care at the Bedside* (Rutherford, Lee, & Greiner, 2004), an initiative launched by the Institute for Healthcare Improvement in partnership with The Robert Wood Johnson Foundation, describes a group of change strategies being tested, refined, and implemented on medical and surgical units in 13 pilot hospitals. This initiative provides examples of interventions that target the nursing work environment and work process redesign on nursing care units.

Transforming Care at the Bedside (Rutherford, Lee, & Greiner, 2004) describes a review of the large body of research by Ulrich, Quan, Zimring, Joseph, and Choudhary (2004) that links improvements in hospital physical work environments to reducing staff stress and fatigue and increasing effectiveness in delivering care, as well as improving patient safety and overall healthcare quality. Ergonomic work environments, although important for all nurses, would be a particularly important strategy for meeting the needs of aging RNs. Acuity-adaptable beds (Rutherford, Lee, & Greiner, 2004) are an example of a redesign that can dramatically reduce the need for patient transfers between nursing units, which consume RN workgroup time, contribute to perceptions of inappropriate workgroup

assignments, and represent opportunities for errors and other patient care problems on nursing units.

Change strategies involving nursing work processes on nursing units could target medication systems, patient discharge scheduling systems, and non-nursing tasks (Rutherford, Lee, & Greiner, 2004). Medication system redesign, such as maintaining a personal cabinet in each patient's room, could improve RN workgroup efficiency. Discharge scheduling systems enable both patients and staff to synchronize activities and increase RN workgroup efficiency. Identifying and shifting non-nursing tasks to others, such as transport, pharmacy, or materials management can free workgroup RNs for direct patient care activities. These change strategies have the potential, by providing RN workgroups more time to spend with patients, to improve RN workgroup satisfaction with task.

Strategies are also needed to address RN workgroup satisfaction with nurse management. For example, nursing unit leadership should ensure RNs entering the RN workgroup to receive an adequate orientation to the unit, and should allow workgroup RNs to have as much control as possible in the workgroup schedule. Nurse administrators can incorporate RN workgroup expectations into the selection and development of unit leadership. Expectations of nurse leadership could explicitly include maximizing the coordination of unit work processes, exerting position power, valuing workgroup contributions, fostering a unit climate in which information is shared within the workgroup effectively, and promoting RN workgroup professional development (Boyle, et al., 1999).

Recommendations

Findings from the study can be used in making recommendations regarding future research, both to refine the RN Workgroup Intent to Stay Model (Figure 5, p. 162) and to move to other research designs. The unique resources of NDNQI can be considered in making recommendations for future studies as well.

Important refinements of the model would be made by further exploration of the workgroup level measurement model for intent to stay, as well as other model variables, and to apply a multiplicative analytic model. Larger samples, particularly of workgroups with high response rates, may yield higher ICC(2) value (see Table 20, p. 172), providing more support for group-mean reliability. This study made important assumptions regarding the reliability and validity of a number of exogenous model variables at the workgroup level, including work context and RN demographic diversity variables. Future research should explore the workgroup level psychometric properties of these variables. In addition, a purely additive analytic model was used in this study. A possible extension would be to consider a multiplicative analytic model, which examines interactions among the predictor variables.

The model should undergo further refinement by the consideration of additional predictor variables. For instance, in addition to Magnet designation, Magnet applicant status should be controlled for, as it seems reasonable that the impact of the Magnet journey may be important. Additional workgroup diversity predictors, such as gender, race, and United States-educated RNs, should be added.

Workgroup vacancy rates may be an important predictor to consider. NDNQI began collecting turnover data from member hospitals in the third quarter of 2007. Different outcomes, such as unit retention or turnover rates may be important model refinements to explore as well.

Perhaps most obviously, the model should undergo further refinement by testing on other unit types. The NDNQI includes RN Survey responses from RN workgroups in unit types that capture all direct care providers in acute care hospitals, including surgical, combined medical-surgical, critical care, step-down, pediatrics, maternal-newborn, surgical services, emergency departments, and rehabilitation, as well as outpatient clinics and labs. An understanding of how predictors of RN workgroup job satisfaction and RN workgroup intent to stay differ among unit types is needed to develop targeted intervention strategies.

Future studies should be conducted using other research designs, including longitudinal designs and interventional designs. The annual NDNQI RN Survey provides the unique opportunity to test workgroup determinants of job satisfaction, intent to stay, and turnover over time. Ultimately, interventional studies are needed to identify empirically supported targeted strategies that can be used to retain workgroup RNs. Future research should focus on interventions designed to test the effects of targeted RN workgroup retention strategies. In medical units, for example, interventions designed to improve RN workgroup ratings of the appropriateness of patient assignments, as well as RN workgroup satisfaction with task and nurse management should be tested.

Conclusion

Relationships depicted in the RN Workgroup Intent to Stay Model (Figure 5, p. 162) were examined, after determining the appropriateness of a workgroup level measurement model for intent to stay. Psychometric analysis found the workgroup level measurement model of intent to stay appropriate, with ICC(2) of .586, an ICC(1) of .064, and zero-order correlations with job satisfaction subscales that were consistently higher at the workgroup level than individual level. Mixed linear modeling supported the fit of the revised RN Workgroup Intent to Stay Model (Figure 7, p. 183) in medical units, and pseudo R^2 indicated the model accounted for 56% of the variance in RN workgroup intent to stay. Findings indicated that retention strategies for RN workgroups on medical units should target perceptions of appropriate workgroup patient assignments, as well as RN workgroup satisfaction with task and RN workgroup nurse management. Refinement of the RN Workgroup Intent to Stay Model should continue by examining model relationships among RN workgroups in other unit types. Understanding of how determinants of RN workgroup intent to stay on the unit vary by unit type support the development of targeted retention strategies, an important component of efforts to address the evolving nursing shortage.

References

- Adams, A., & Bond, S. (1997). Clinical specialty and organizational features of acute hospital wards. *Journal of Advanced Nursing*, 26, 1158-1167.
- Agency for Healthcare Research and Quality. (2004). Hospital nurse staffing and quality of care. Retrieved January 10, 2006, from <http://www.ahrq.gov>.
- Aiken, L.H., Clarke, S.P., & Sloane, D.M. (2001). Hospital restructuring: Does it adversely affect care and outcomes? *Journal of Health and Human Services Administration*, 23, 416-442.
- Aiken, L.H., Clarke, S.P., Sloane, D.M., Sochalski, J.A., Busse, R., Clarke, H., Giovannetti, P., Hunt, J., Rafferty, A.M., & Shamian, J. (2001). Nurses' reports on hospital care in five countries. *Health Affairs*, 20, 43-53.
- Aiken, L.H., Clarke, S.P., Sloane, D.M., Sochalski, J., & Silber, J.H. (2002). Hospital nurse staffing and patient mortality, nurse burnout, and job dissatisfaction. *Journal of the American Medical Association*, 288, 1987-1993.
- Aiken, L.H., Lake, E.T., Sochalski, J.A., & Sloane, D.M. (1997). Design of an outcome study of the organization of hospital AIDS care. In *Research in the Sociology of Health Care*, 14, pp. 3-26. Ed: Kronenfeld, J.J. Greenwich, CT: JAI Press.
- Aiken, L.H., & Patrician, P.A. (2000). Measuring organizational traits of hospitals: The Revised Nursing Work Index. *Nursing Research*, 49, 146-153.
- Aiken, M., & Hage, J. (1968). Organizational interdependence and intra-organizational structure. *American Sociological Review*, 33, 912-930.

- Alexander, J. A., Lichtenstein, R., Oh, H.O., & Ullman, E. (1998). A causal model of voluntary turnover among nursing personnel in long-term psychiatric settings. *Research in Nursing & Health, 21*, 415-27.
- American Association of Colleges of Nursing. (2001). Strategies to Reverse the New Nursing Shortage. Retrieved January 11, 2006, from <http://aacn.nche.edu/Publications/positions/tricshortage.htm>
- American Association of Colleges of Nursing. (2006). Nursing Shortage Fact Sheet. Retrieved September 26, 2006, from <http://www.aacn.nch.edu/Media/FactSheets/NursingShortage.htm>.
- American Association of Critical Care Nurses (2005). Standards for establishing and sustaining healthy work environments: A journey to excellence. Retrieved January 12, 2006, from <http://aacn.org/aacn/pubpolicy.ncf/vwdoc/workenv?opendocument>
- American College of Healthcare Executives. (2005). Top issues confronting hospitals: 2005. Retrieved January 9, 2006, from <http://www.ache.org/PUBS/research/ceoissues.cfm>.
- American Hospital Association. (2001). The healthcare workforce shortage and its implications for America's hospitals. Retrieved January 9, 2006 from http://www.aha.org/aha/key_issues/workforce/resources/Content/FedWorkforceReport.pdf.
- American Nurses' Association. (1995). *Nursing care report card for acute care*. Washington, DC: American Nurses Publishing.

- American Nurses Association. (2001a). Analysis of American Nurses Association Staffing Survey. Retrieved January 11, 2006, from http://nursingworld.org/staffing/ana_pdf.pdf.
- American Nurses Association. (2001b). Health & Safety Survey. Retrieved January 11, 2006, from <http://nursingworld.org/surveys/hssurvey.pdf>.
- American Nurses Association. (2002). Nursing's Agenda for the future. Retrieved January 11, 2006, from <http://nursingworld.org/naf/>.
- American Nurses Credentialing Corporation. (2006). Health care organizations with magnet designated nursing services. Retrieved January 11, 2006, from <http://www.nursingworld.org/ancc/magnet/magnet2.htm>.
- American Organization of Nurse Executives. (2000). *Perspectives on the nursing shortage: A blueprint for action*. Chicago, IL: Author.
- American Organization of Nurse Executives. (2002). Acute Care Hospital Survey of RN Vacancy and Turnover rates. Retrieved January 9, 2006, from <http://aha.org/workforce/pdf/aone-surveyrnavacancy.pdf>.
- Ammouri, A., Ebbert, D., Kosiack, C., & Peterson, M. (2003). Psychometric analysis of developmental items in the National Database of Quality Indicators – Adapted Index of Work Satisfaction. Unpublished Manuscript.
- Berliner, H.S., & Ginzberg, E. (2002). Why this hospital nursing shortage is different. *Journal of the American Medical Association*, 288, 2742-2744.
- Bleich, M.R., & Hewlett, P.O. (2004). Dissipating the “perfect storm” – responses from nursing and the health care industry to protect the public's health.

Online Journal of Issues in Nursing. Retrieved January 10, 2006 from http://www.nursingworld.org/ojin/topic24/tpc24_4.htm.

- Bleich, M.R., Hewlett, P.O., Santos, S.R., Rice, R.B., Cox, K.S., & Richmeier, S. (2003). Analysis of the nursing workforce crisis: A call to action. *American Journal of Nursing*, 103, 66-74.
- Bliese, P.D. (2000). Within-group agreement, non-independence, and reliability: Implications for data aggregation and analysis. In K. J. Klein & S.W.J. Kozlowski (Eds.), *Multilevel Theory, Research, and Methods in Organizations* (pp. 349-381). San Francisco: Jossey-Bass.
- Bliese, P.D., & Britt, T.W. (2001). Social support, group consensus and stressor-strain relationships: Social context matters. *Journal of Organizational Behavior*, 22, 425-436.
- Bliese, P.D., & Halverson, R.R. (1998). Group consensus and psychological well-being: A large field study. *Journal of Applied Social Psychology*, 28, 563-580.
- Bluedorn, A.C. (1982). A unified model of turnover from organizations. *Human Relations*, 35, 135-153.
- Borda, R.G., & Norman, I.J. (1997). Factors influencing turnover and absence of nurses: A research review. *International Journal of Nursing Studies*, 34, 385-394.
- Bott, M. J., Boyle, D., Woods, C.Q., & Taunton, R.L. (1993). Intent to stay among hospital nurses who practice in various specialties. Unpublished manuscript.

- Boyle, D. K., Bott, M.J., Hansen, H.E., Woods, C.Q., & Taunton, R.L. (1999). Managers' leadership and critical care nurses' intent to stay. *American Journal of Critical Care, 8*, 361-71.
- Boyle, D.K., Miller, P.A., Gajewski, B., & Dunton, N. (2006). [Psychometric analyses of the NDNQI RN Survey]. Unpublished raw data.
- Boyle, D. K., Miller, P.A., Gajewski, B.J., Hart, S.E., & Dunton, N. (2006). Unit type differences in RN workgroup job satisfaction. *Western Journal of Nursing Research, 28*, 622-640.
- Brady-Schwartz, D.C. (2005). Further evidence on the Magnet recognition program. *Journal of Nursing Administration, 35*, 397-403.
- Brayfield, A., & Rothe, H. (1951). An index of job satisfaction. *Journal of Applied Psychology, 35*, 307-311.
- Brush, B.L., Sochalski, J., & Berger, A.M. (2004). Imported care: Recruiting foreign nurses to U.S. health care facilities. *Health Affairs, 23*, 78-87.
- Buerhaus, P.I., Donelan, K., Ulrich, B.T., Kirby, L., Norman, L., & Dittus, R. (2005). Registered nurses' perceptions of nursing. *Nursing Economics, 23*, 110-107.
- Buerhaus, P.I., Donelan, K., Ulrich, B.T., Norman, L., & Dittus, R. (2005). Is the shortage of hospital registered nurses getting better or worse? Findings from two recent national surveys of RNs. *Nursing Economics, 23*, 61-96.
- Buerhaus, P.I., Donelan, K., Ulrich, B.T., Norman, L., & Dittus, R. (2006). State of the registered nurse workforce in the United States. *Nursing Economics, 24*, 6-12.

- Buerhaus, P.I., Needleman, J., Mattke, S., & Stewart, M. (2002). Strengthening hospital nursing. *Health Affairs, 21*, 123-132.
- Buerhaus, P.I., Norman, L., Donelan, K., Williams, M., Ulrich, B.T., & Dittus, R. (2005). Hospital RNs' and CNOs' perceptions of the impact of the nursing shortage on the quality of care. *Nursing Economics, 23*, 214-221.
- Buerhaus, P.I., & Staiger, D.O. (1999). Trouble in the nurse labor market? Recent trends and future outlook. *Health Affairs, 18*, 214-222.
- Buerhaus, P.I., Staiger, D.O., & Auerbach, D.I. (2000a). Implications of an aging registered nurse workforce. *Journal of the American Medical Association, 283*, 2948-2954.
- Buerhaus, P.I., Staiger, D.O., & Auerbach, D.I. (2000b). Why are shortages of hospital RNs concentrated in specialty care units? *Nursing Economics, 18*, 111-116.
- Buerhaus, P.I., Staiger, D.O., & Auerbach, D.I. (2003). Is the current shortage of hospital nurses ending? *Health Affairs, 22*, 191-198.
- Buerhaus, P.I., Staiger, D.O., & Auerbach, D.I. (2004). New signs of a strengthening U.S. nurse labor market? *Health Affairs, 23* S2, W4526-W4533.
- Cameron, S.J., Horsburgh, M.E., & Armstrong-Stassen, M. (1994). Job satisfaction, propensity to leave and burnout in RNs and RNAs: A multivariate perspective. *Canadian Journal of Nursing Administration, 7*(3), 43-64.
- Cavanagh, S.J. (1989). Nursing turnover: Literature review and methodological critique. *Journal of Advanced Nursing, 14*, 587-596.

- Cavanagh, S. J., & Coffin, D.A. (1992). Staff turnover among hospital nurses. *Journal of Advanced Nursing, 17*, 1369-76.
- Chan, D. (1998). Functional relations among constructs in the same content domain at different levels of analysis: A typology of composition models. *Journal of Applied Psychology, 83*, 234-246.
- Chang, Y., Hughes, L.C., & Mark, B. (2006). Fitting in or standing out: Nursing workgroup diversity and unit level outcomes. *Nursing Research, 55*, 373-380.
- Clochesy, J.M. (2004). Hardware and software options. In J.J. Fitzpatrick & K.S. Montgomery (Eds), *Internet for nursing research: A guide to strategies, skills, and resources* (pp. 120-128). New York: Springer Publishing Company.
- Cox, K.B. (2001). The effects of unit morale and interpersonal relations on conflict in the nursing unit. *Journal of Advanced Nursing, 35*, 17-25.
- Cronin-Stubbs, D., & Rooks, C.A. (1985). The stress, social support, and burnout of critical care nurses: The results of research. *Heart & Lung, 14*, 31-39.
- Curry, J. P., Wakefield, D.S., Price, J.L., Mueller, C.W., & McCloskey, J.C. (1985). Determinants of turnover among nursing department employees. *Research in Nursing & Health, 8*, 397-411.
- Decker, F. H. (1985). Socialization and interpersonal environment in nurses' affective reactions to work. *Social Science and Medicine, 20*, 499-509.
- Diamond, L.K., & Fox, D.J. (1958). Turnover among hospital staff nurses. *Nursing Outlook, 6*, 388-391.

- Donabedian, A. (1988). The quality of care: How can it be assessed? *Journal of the American Medical Association*, 260, 1743-1748.
- Donabedian, A. (1992). The role of outcomes in quality assessment and assurance. *Quality Review Bulletin*, 18, 356-360.
- Dunton, N., Gajewski, B., & Klaus, S. (2005, June). Effect of short stay patients on the measurement of nursing-sensitive quality indicators. Poster session presented at Annual Research Meeting of AcademyHealth, Boston, MA.
- Elliott, C. G. S. (2006). Using aggregated micro-level data as measures of macro-level phenomena: The case of the NDNQI-RN Satisfaction Survey. Unpublished Doctoral Dissertation, University of Kansas, Lawrence.
- Elliott, C., & Boyle, D.K. (2003, November 1-5). *Group level reliability and validity of the NDNQI-Adapted Index of Work Satisfaction*. Proceedings of the 37th Biennial Convention, Sigma Theta Tau, International, Toronto, Ontario, Canada.
- Federation of Nurses and Health Professionals. (2001). The nurse shortage: Perspectives from current direct care nurses and former direct care nurses. Retrieved January 9, 2006, from http://www.aft.org/healthcare/download/Hart_Report.pdf.
- Friss, L. (1994). Nursing studies laid end to end form a circle. *Journal of Health Politics, Policy and Law*, 19, 597-629.
- General Accounting Office. (2001a). Nursing workforce: Emerging nurse shortages due to multiple factors. (GAO-01-944). Washington DC: Author.

- General Accounting Office (2001b). Nursing workforce: Multiple factors create nurse recruitment and retention problems. (GAO-01-912T). Washington DC: Author.
- Glick, W. H. (1985). Conceptualizing and measuring organizational and psychological climate: Pitfalls in multilevel research. *Academy of Management Review, 10*, 601-616.
- Goodin, H.J. (2003). The nursing shortage in the United States of America: An integrative review of the literature. *Journal of Advanced Nursing, 43*, 335-350.
- Gurney, C.A., Mueller, C.W., & Price, J.L. (1997). Job satisfaction and organizational attachment of nurses holding doctoral degrees. *Nursing Research, 46*, 163-171.
- Hart, S., Gajewski, B., & Dunton, N. (2006). Unpublished data.
- Health Resources and Services Administration. (2002). Projected supply, demand, and shortages of registered nurses: 2000-2020. Retrieved January 9, 2006, from http://www.ahca.org/research/rnsupply_demand.pdf.
- Health Resources and Services Administration. (2004). The registered nurse population: national sample survey of registered nurses. Preliminary findings. Retrieved January 9, 2006, from <http://bhpr.gov/healthworkforce/reports/rnpopulation/preliminaryfindings.htm>
- .

- Hinshaw, A.S. & Atwood, J.R. (1983). Nursing Staff Turnover, stress, and satisfaction: Models, measures, and management. *Annual Review of Nursing Research, 1*, 133-153.
- Hinshaw, A.S., & Atwood, J.R. (1983-1985). *Anticipated turnover among nursing staff study* (DHSS, Division of Nursing, Grant No. 1-R01-NU00908). Tucson: University of Arizona.
- Hinshaw, A. S., Smeltzer, C.H., & Atwood, J.R. (1987). Innovative retention strategies for nursing staff. *Journal of Nursing Administration, 17*, 8-16.
- Hofmann, D.A., Griffin, M.A., & Gavin, M.B. (2000). The application of hierarchical linear modeling to organizational research. In K. J. Klein & S.W.J. Kozlowski (Eds.), *Multilevel Theory, Research, and Methods in Organizations* (pp. 467-511). San Francisco: Jossey-Bass.
- Hom, P. W., & Griffeth, R.W. (1991). Structural Equations Modeling Test of a Turnover theory: Cross-Sectional and Longitudinal Analysis. *Journal of Applied Psychology, 76*, 350-366.
- Homans, G.C. (1950). *The human group*. New York: Hartcourt, Brace, & World.
- Ingersoll, G.L., Olsan, T., Drew-Cates, J., DeVinney, B.C., & Davies, J. (2002). Nurses' job satisfaction, organizational commitment, and career intent. *Journal of Nursing Administration, 32*, 250-263.
- Institute of Medicine. (2004). *Keeping patients safe: Transforming the work environment of nurses*. Washington, DC: National Academies Press.

- Irvine, D.M., & Evans, M.G. (1995). Job satisfaction and turnover among nurses: Integrating research findings across studies. *Nursing Research, 44*, 246-253.
- Jackson, G. (1980). Methods for integrative reviews. *Review of Educational Research, 50*, 438-460.
- Jinnett, K., & Alexander, J.A. (1999). The influence of organizational context on quitting intention. *Research on Aging, 21*, 176-204.
- Joint Commission on Accreditation of Healthcare Organizations. (2004). Health care at the crossroads: Strategies for addressing the evolving nursing crisis. Retrieved January 9, 2006, from <http://www.aacn.nche.edu/Media/shortageresource.htm>.
- Jones, C.B. (2004). The costs of nurse turnover: part 1: An economic perspective. *Journal of Nursing Administration, 34*, 562-570.
- Jones, C.B. (2005). The costs of nurse turnover: part 2: Application of the nursing turnover cost calculation methodology. *Journal of Nursing Administration, 34*, 562-570.
- Kaye, B.K., & Johnson, T.J. (1999). Research methodology: Taming the cyber frontier—techniques for improving online surveys. *Social Science Computer Review, 17*, 323-337.
- Klaus, S.F. (2006). Job satisfaction and intent to stay in birth cohorts of nurses. Unpublished Doctoral Dissertation, University of Kansas, Lawrence.
- Kozlowski, S.W.J., & Klein, K.J. (2000). A multilevel approach to theory and research in organizations: Contextual, temporal, and emergent processes. In

- K. J. Klein & S.W.J. Kozlowski (Eds.), *Multilevel Theory, Research, and Methods in Organizations* (pp. 3-90). San Francisco: Jossey-Bass.
- Kramer, M. (1968). Nurse role deprivation—A symptom of needed change. *Social Science & Medicine*, 2, 461-474.
- Kramer, M., & Hafner, L.P. (1989). Shared values: Impact on staff nurse job satisfaction and perceived productivity. *Nursing Research*, 38, 172-77.
- Krausz, M., Yaakobivitz, N., Bizman, A., & Caspi, T. (1999). Evaluation of coworker turnover outcomes and its impact on the intention to leave of remaining employees. *Journal of Business and Psychology*, 14, 95-107.
- Lacey, S.R., Cox, K.S., Lorfing, K.C., Teaslely, S.L., Carroll, C.A., & Sexton, K. (2007). Nursing support, workload, and intent to stay in magnet, Magnet-aspiring, and non-Magnet hospitals. *Journal of Nursing Administration*, 37, 199-205.
- Lake, E.T. (2002). Development of the Practice Environment Scales of the Nursing Work Index. *Research in Nursing & Health*, 25, 176-188.
- Lake, E. T. (1998). Advances in understanding and predicting nurse turnover. *Research in the Sociology of Health Care*, 15, 147-171.
- Lake, E.T., & Friese, C.R. (2006). Variations in nursing practice environments: Relation to staffing and hospital characteristics. *Nursing Research*, 55, 1-9.
- Laschinger, H.K.S., Shamian, J., Thomson, D. (2001). Impact of magnet hospital characteristics on nurses' perception of trust, burnout, quality of care and work satisfaction. *Nursing Economics*, 19, 325-336.

- Lau, D.C., & Murnighan, J.K. (1998). Demographic diversity and faultlines: The compositional dynamics of organizational groups. *Academy of Management Review, 23*, 325-340.
- Leatt, P., & Schneck, R. (1980). Differences in stress perceived by head nurses across nursing specialties in hospitals. *Journal of Advanced Nursing, 5*, 31-46.
- Leatt, P., & Schneck, R. (1984). Criteria for grouping nursing subunits in hospitals. *Academy of Management Journal, 27*, 150-165.
- Leveck, M. L., & Jones, C.B. (1996). The nursing practice environment, staff retention, and quality of care. *Research in Nursing & Health, 19*, 331-43.
- Lilienfeld, D.E., & Stolley, P.D. (1994). *Foundations of Epidemiology* (3rd ed.). New York: Oxford University Press.
- Lindell, M.K., & Brandt, C.J. (2000). Climate quality and climate consensus as mediators of the relationship between organizational antecedents and outcomes. *Journal of Applied Psychology, 85*, 331-348.
- Lucas, M. D., Atwood, J.R., & Hagan, R. (1993). Replication and validation of anticipated turnover model for urban registered nurses. *Nursing Research, 42*, 29-35.
- Lum, L., Kervin, J., Clark, K., Reid, F., & Sirola, W. (1998). Explaining nursing turnover intent: Job satisfaction, pay satisfaction, or organizational commitment? *Journal of Organizational Behavior, 19*, 305-320.

- Maertz, C.P., & Campion, M.A. (1998). 25 years of voluntary turnover research: A review and critique. *International Review of Industrial and Organizational Psychology, 13*, 49-81.
- Magee, T., Lee, S.M., Giuliano, K.K., & Munro, B. (2006). Generating new knowledge from existing data: The use of large data sets for nursing research, *Nursing Research, 55*(2S), S50-56.
- McCloskey, J. (1974). Influence of rewards and incentives on staff nurse turnover rate. *Nursing Research, 23*, 239-247.
- Mobley, W.H., Horner, S.O., & Hollingsworth, A. (1978). An evaluation of precursors of hospital employee turnover. *Journal of Applied Psychology, 63*, 408-414.
- Montgomery, K.S. (2004). An overview of research methods using the internet. In J.J. Fitzpatrick & K.S. Montgomery (Eds), *Internet for nursing research: A guide to strategies, skills, and resources* (pp. 41-46). New York: Springer Publishing Company.
- Muchinsky, P.M., & Morrow, P.C. (1980). A multidisciplinary model of voluntary employee turnover. *Journal of vocational Behavior, 17*, 263-290.
- Mueller, C. W., & Price, J.L. (1990). Economic, psychological, and sociological determinants of voluntary turnover. *Journal of Behavioral Economics, 19*, 321-335.

- Musil, C.M., Jones, S.L., & Warner, C.D. (1998). Structural Equation Modeling and its relationship to multiple regression and factor analysis. *Research in Nursing & Health, 21*, 271-281.
- NDNQI Project Staff. (October, 2006). NDNQI Guidelines for data collection and submission on quarterly indicators (Vol. 6.0). (Available from the National Database for Nursing Quality Indicators, University of Kansas School of Nursing, 3901 Rainbow Blvd., Kansas City, KS 66106).
- Nahm, E., Mills, M.E.C., & Resnick, B.M. (2004). Survey Research. In J.J. Fitzpatrick & K.S. Montgomery (Eds), *Internet for nursing research: A guide to strategies, skills, and resources* (pp. 69-80). New York: Springer Publishing Company.
- National Quality Forum (2004). *National Voluntary Consensus Standards for Nursing-Sensitive Care: An Initial Performance Measure Set*. Washington, DC: Author.
- Needleman, J., Buerhaus, P.I., Mattke, S., Stewart, M., & Zelevinsky, K. (2001). Nurse staffing and patient outcomes in hospitals. Health Resources Services Administration, Contract No. 230-99-0021. Harvard School of Public Health, Boston: MS.
- Needleman, J., Buerhaus, P., Mattke, S., Stewart, M., & Zelevinsky, K. (2002). Nurse-staffing levels and the quality of care in hospitals. *New England Journal of Medicine, 346*, 1715-1722.

- Needleman, J., Buerhaus, P., Stewart, M., Zelevinsky, K., & Mattke, S. (2006). Nurse staffing in hospitals: Is there a business case for quality? *Health Affairs, 25*, 204-211.
- Norrish, B.R., & Rundall, T.G. (2001). Hospital restructuring and the work of registered nurses. *The Milbank Quarterly, 79*, 55-79.
- Ostroff, C. (1992). The relationship between satisfaction, attitudes, and performance: An organizational level analysis. *Journal of Applied Psychology, 77*, 963-974.
- Park, S., & Lake, E.T. (2005). Multilevel modeling of a clustered continuous outcome: Nurses' work hours and burnout. *Nursing Research, 54*, 406-13.
- Parasuraman, S. (1989). Nursing turnover: an integrated model. *Research in Nursing & Health, 12*, 267-77.
- Petersen, M.D., & White, S.L. (1989). *Health care and the elderly: An information sourcebook*. Newbury Park, CA: Sage.
- Pew Health Professions Commission. (1995). Critical challenges: Revitalizing the health professions for the 21st century. Retrieved September 26, 2006, from http://www.futurehealth.ucsf.edu/pdf_files/challenges.pdf.
- Porter, L.W., & Steers, R.M. (1973). Organizational, work, and personal factors in employee turnover and absenteeism. *Psychological Bulletin, 80*, 151-176.
- Porter, L.W., Steers, R.M., Mowday, R.T., & Boulian, P.V. (1974). Organizational commitment, job satisfaction, and turnover among psychiatric technicians. *Journal of Applied Psychology, 59*, 603-609.

- Price, J.L. (1972). *Handbook of organizational measurement*. Lexington, MS: D.C. Heath.
- Price, J.L. (1977). *The Study of Turnover*. Ames, IQ: Iowa State University Press.
- Price, J. L., & Mueller, C.W. (1981). *Professional Turnover: The case of nurses*. New York, SP Medical & Scientific Books.
- Price, J.L., & Mueller, C.W. (1986). *Absenteeism and Turnover of Hospital Employees*. Greenwich, CT: JAI Press.
- Prigogine, I. & Stengers, I. (1984). *Out of Chaos: Man's new dialogue with nature*. New York: Bantam Books.
- Ridout, M.S., Demetrio, C.G.B., Firth, D. (1999). Estimating intraclass correlation for binary data. *Biometrics*, 55, 137-148.
- Robert Wood Johnson Foundation. (2002). Health Care's Human Crisis: The American Nursing Shortage. Retrieved January 11, 2006, from <http://www.rwjf.org/files/publications/other/NursingReport.pdf>.
- Rogers, A.E., Hwang, W., & Scott, L.D. (2004). The effects of work breaks on staff nurse performance. *Journal of Nursing Administration*, 11, 512-519.
- Rousseau, D.M. (1985). Issues of level in organizational research? Multilevel and cross-level perspectives. In L. L. Cummings & B.Straw (Eds.), *Research in organizational behavior* (Vol. 7, pp. 1-37). Greenwich, CT: JAI.
- Rutherford, P., Lee, B., Greiner, A. (2004). Transforming Care at the Bedside. IHI Innovation Series white paper. Boston: Institute for Healthcare Improvement. Retrieved July 13, 2007, from

<http://www.ihi.org/IHI/Reports/WhitePapers/TransformingCareattheBedsideWhitePaper.htm>.

- Scott, J.G., Sochalski, J., & Aiken, L. (1999). Review of Magnet Hospital Research: Findings and implications for professional nursing practice. *Journal of Nursing Administration, 29*, 9-19.
- Sheridan, J. E., & Vredenburgh, D.J. (1979). Structural model of leadership influence in a hospital organization. *Academy of Management Journal, 22*, 6-21.
- Sochalski, J. (2002). Nursing Shortage Redux: Turning the corner on an enduring problem. *Health Affairs, 21*, 157-282.
- Sochalski, J. (2004). Is more better? The relationship between nurse staffing and the quality of nursing care in hospitals. *Medical Care, 42*, II-67-II-73.
- Spratley, E., Johnson, A., Sochalski, J., Fritz, M., & Spencer, W. (2000). *The Registered Nurse Population: Findings from the National Sample Survey of Registered Nurses*. Rockville, MD: Division of Nursing, Bureau of Health Professions, Health Resources and Services Administration, U.S. Department of Health and Human Services.
- Staiger, D.O., Auerbach, D.I., & Buerhaus, P.I. (2000). Expanding career opportunities for women and the declining interest in nursing as a career. *Nursing Economics, 18*, 230-236.
- Stamps, P. (1997). *Nurses and work satisfaction: An index for measurement*. Chicago: Health Administration Press.

- Stone, P.W., Larson, E., Mooney-Kane, C., Lin, S., & Dick, A. (2006). Organizational climate and ICU nurses' intention to leave. *Critical Care Medicine, 34*, 1907-1912.
- Tai, T.W., Bame, C.I., & Robinson, C.D. (1998). Review of nursing turnover research 1977-1996. *Social Science & Medicine, 47*, 1905-1929.
- Taunton, R.L., Bott, M.J., Koehn, M.L., Miller, P.A., Rindner, E., pace, K., Elliott, C., Bradley, K.J., Boyle, D., & Dunton, N. (2004). The NDNQI-Adapted Index of Work Satisfaction. *Journal of Nursing Measurement, 12*, 101-122.
- Taunton, R.L., Bott, M.J., Boyle, D.K., Miller, P.A. & Elliott, C. (1999-2004). [Psychometric analyses of the NDNQI RN Satisfaction Survey]. Unpublished raw data.
- Taunton, R.L., Boyle, D.K., Woods, C.Q., Hansen, H.E., & Bott, M.J. (1997). Manager Leadership and retention of hospital staff nurses. *Western Journal of Nursing Research, 19*, 205-226.
- Turner, R.M., Omar, R.Z., & Thompson, S.G. (2006). Constructing intervals for the intracluster correlation coefficient using Bayesian modeling, and application in cluster randomized trials. *Statistics in Medicine, 25*, 1443-1456.
- Ulrich, B.T., Buerhaus, P.I., Donelan, K., Norman, L., & Dittus, R. (2007). Magnet status and registered nurse views of the work environment and nursing as a career. *Journal of Nursing Administration, 37*, 212-220.

- Ulrich, B.T., Woods, D., Hart, K.A., Lavandero, R., Leggett, J., & Taylor, D. (2007). Critical care nurses' work environments value of excellence in Beacon units and Magnet organizations. *Critical Care Nurse, 27*, 68-77.
- Ulrich, R., Quan, X., Zimring, C., Joseph, A., & Choudhary, R. (2004). The role of the physical environment in the hospital of the 21st century: A once-in-a-lifetime opportunity. Retrieved July 13, 2007, from <http://www.rwjf.org/files/publications/other/RoleofthePhysicalenvironment.pdf>.
- United States Census Bureau. Metropolitan and Micropolitan Statistical Areas. Retrieved September 13, 2006, from <http://www.census.gov/population/www/estimates/metroarea.html>.
- Upenicks, V. (2002). Assessing differences in job satisfaction of nurses in magnet and non-magnet hospitals. *Journal of Nursing Administration, 32*, 564-576.
- Urden, L.D., & Monarch, K. (2002). The ANCC Magnet Recognition Program: Converting research findings into action. In M.L. McClure & A.S. Hinshaw (Eds.), *Magnet hospitals revisited: Attraction and retention of professional nurses*. Washington, DC: American Nurses Publishing.
- Verran, J.A., Gerber, R., & Milton, D. (1995). Data aggregation: criteria for psychometric evaluation. *Research in Nursing & Health, 18*, 77-80.
- Verran, J.A., Mark, B.A., & Lamb, G. (1992). Psychometric examination of instruments using aggregated data. *Research in Nursing & Health, 15*, 237-240.

- Veterans' Health Administration. (2001). A call to action: VA's response to the national nursing shortage. Retrieved January 11, 2006, from <http://www.oregoncenterfornursing.org/shortage.php>.
- VHA Research Series. (2002). The business case for work force stability. Retrieved January 11, 2006, from http://www.vha.com/portal/server.pt/gateway/PTARGS_0_2_1526_341_0_43/http%3Bremote.vha.com/public/research/docs/stabilitiy.pdf.
- Wakefield, D.S., Curry, J.P., Price, J.L., Mueller, C.W., & McCloskey, J.C. (1988). Differences in work unit outcomes: Job satisfaction, organizational commitment, and turnover among hospital nursing department employees. *Western Journal of Nursing Research, 10*, 98-105.
- Weisman, C. S. (1982). Recruit from within: hospital nurse retention in the 1980s. *Journal of Nursing Administration, 12*, 24-31.
- Weisman, C. S., Alexander, C.S., & Chase, G.A. (1981a). Determinants of hospital staff nurse turnover. *Medical Care, 19*, 431-43.
- Weisman, C. S., Alexander, C.S., & Chase, G.A. (1981b). Evaluating reasons for nursing turnover: comparison of exit interview and panel data. *Evaluation & The Health Professions, 4*, 107-27.
- West, B.T., Welch, K.B., & Galecki, A.T. (2007). *Linear mixed models: A practical guide using statistical software*. Boca Raton, FL: Chapman & Hall.

Williams, K.Y. & O'Reilly, C.A. (1998). Demography and diversity in organizations: A review of 40 years of research. *Research in Organizational Behavior*, 20, 77-140.

APPENDIX A

Abstraction Form

 Appendix A

 Abstraction Form

Conceptual Model

- Presentation of conceptual model
- Theoretical focus
- Important extraneous variability

Setting

- Data collection year
- Number, type, geographic location of institutions
- Number, type of units

Sample

- Unit of analysis
- Sufficiency of sample frame
- Description of sample selection procedures
- Description of subjects
- Description of non-participants
- Adequacy of sample size
- Subsamples analyzed

Causal Modeling

- Appropriate study design
- Appropriate analytic method

Variables (outcome, intervening, exogenous, correlates)

- Description of variables
- Description of data collection methods
- Validity and reliability of measures

Results

- Presentation of variance explained by model
- Presentation of variance explained by model variables
- Presentation of direct, indirect, and total effects of model variables
- Presentation of final empirical model
- Accuracy of results

Note. Adapted from Health care and the elderly: An information sourcebook (pp. 550-561), by M.D. Petersen and S.L. White, 1989, Newbury Park, CA: Sage.

APPENDIX B

2006 NDNQI RN Survey with Job Satisfaction Scales



2006 NDNQI RN Survey with Job Satisfaction Scales

The NDNQI RN Survey with Job Satisfaction Scales contains job satisfaction items as well as work contextual and nurse demographic items. The job satisfaction questions include the NDNQI adaptation of Stamps' (1997) *Index of Work Satisfaction* (adapted with permission of Dr. Paula Stamps), the NDNQI adaptation of selected items of the Aiken and Patrician (2000) *Nursing Work Index* (adapted with permission from Dr. Aiken), and the Job Enjoyment Scale, from Brayfield and Rothe's (1951) questionnaire. Job satisfaction subscales include: *Task, Nurse-Nurse Interactions, Nurse-Physician Interactions, Decision-Making, Autonomy, Professional Status, Pay, Supportive Nurse Management, Nursing Administration, Professional Development, and Job Enjoyment*. Job satisfaction is measured at the work group or unit level, just as all other indicators included in the NDNQI. For this reason, job satisfaction items ask RNs for their opinion about the feelings of the RNs on the unit.

Work contextual items relate to RN job plans, quality of care, ratings of the last shift worked, shift and shift rotation, breaks, floating, and overtime. Items regarding breaks were adapted with permission from Dr. Ann Rogers (Rogers, Hwang, & Scott, 2004). Demographic items include RN characteristics, tenure, and credentials.

Individual-level items were added in response to participants' concern that their own personal feelings were not being considered. These items, which ask RNs to rate their own individual level of job satisfaction, were selected to represent the subscales of the NDNQI-Adapted Index of Work Satisfaction, Nursing Work Index, and Job Enjoyment Scale.

Finally, 13 items were added by ANA to collect information for the Nurse Competence in Aging Initiative. These items were excluded from the Short Form. The items are posted on the RN Satisfaction Home Page (www.nursingquality.org) under the Instrument link. The data collected from these items will not be included in the NDNQI RN Satisfaction Report. Go to www.GeroNurseOnline.org for contact and other information on this initiative.

NDNQI-Adapted Index of Work Satisfaction

Nurses with whom I work would say that:

Response options: strongly agree, agree, tend to agree, tend to disagree, disagree, strongly disagree.

Task

1. They are satisfied with the nursing care they provide to patients.
2. They could do a better job if they did not have so much to do all the time.
3. They have plenty of time to discuss patient care problems with other nursing service personnel.
4. They have sufficient time for direct patient care.

5. They have plenty of opportunity to discuss patient-care problems with other nursing service personnel.
6. They could deliver much better patient care if they had more time with each patient.

Nurse-Nurse Interaction

1. Nursing personnel pitch in and help each other when things get in a rush.
2. It is hard for new nurses to feel “at home” on the unit.
3. There is a good deal of teamwork among nursing personnel.
4. They are satisfied with the interactions among the nursing staff.
5. Nursing personnel are not as friendly and outgoing as they would like.
6. The nurses on our unit support each other.

Nurse-Physician Interaction

1. Physicians in general cooperate with nursing staff.
2. They are not satisfied with their interactions with hospital physicians.
3. There is a lot of teamwork between nurses and doctors on our unit.
4. Physicians at this hospital look down too much on the nursing staff.
5. Physicians respect the skill and knowledge of the nursing staff.
6. Physicians at this hospital generally appreciate what the nursing staff do.

Decision-Making

1. There is ample opportunity for nursing staff to participate in administrative decision-making processes.
2. Administrative decisions at this hospital interfere too much with patient care.
3. They are not satisfied with their participation in decision-making for the unit.
4. They have all the voice they want in planning policies and procedures for the unit.
5. Nursing administrators generally consult with the staff on daily problems.
6. They have the freedom in their work to make important decisions.
7. They can count on nursing administrators to back them up.

Autonomy

1. They have sufficient input into the program of care for each of their patients.
2. They have too much responsibility and not enough authority.
3. Nurses have a good deal of control over their own work.
4. They are frustrated sometimes because their activities seem programmed for them.
5. They are required sometimes to do things on the job that are against their better professional judgment.
6. Nurses need more autonomy in their daily practice.
7. They are free to adjust their daily practice to fit patient needs.

Professional Status

1. Staff in other departments appreciate nursing.
2. They are proud to talk to other people about what they do on the job.
3. They are satisfied with the status of nursing in the hospital.
4. Patients (family members) acknowledge nursing’s contribution to their care.
5. They recommend this hospital to others as a good place for nurses to work.
6. Their work contributes to a sense of personal achievement.

Pay

1. Their present salary is satisfactory.
2. A lot of nursing personnel at this hospital are dissatisfied with their pay.
3. The pay they get is reasonable, considering what is expected of nursing service personnel at this hospital.
4. The latest salary increases for nursing service personnel at this hospital are unsatisfactory.
5. They are being paid fairly compared to what they hear about nursing personnel at other hospitals.
6. An upgrading of pay schedules for nursing personnel is needed at this hospital.

NDNQI-Adapted Nursing Work Index

Nurses with whom I work would say that:

Response options: strongly agree, agree, tend to agree, tend to disagree, disagree, strongly disagree.

Professional Development

1. They have career development opportunities.
2. They have access to regional and national conferences.
3. They have access to active inservice programs for nurses.
4. They have support for pursuing degrees in nursing.
5. They have a preceptor program for newly hired RNs.
6. They have clinical nurse specialists who provide patient care consultations.
7. They have flexible work schedules.
8. They have access to continuing education programs for nurses.
9. They have opportunities for advancement.
10. They are not satisfied with opportunities for professional development.

Supportive Nursing Management

1. Their nurse manager is a good manager and leader.
2. Their nurse manager is supportive of nurses.
3. Their nurse manager backs up the nursing staff in decision making even in conflicts with physicians.
4. They are not satisfied with their nurse manager.
5. Their nurse manager consults with staff on daily problems.

Nursing Administration

1. They are satisfied with the hospital chief nurse executive.
2. Their hospital chief nurse executive is equal in authority to other top-level hospital executives.
3. Their hospital chief nurse executive is visible to staff.
4. Their hospital chief nurse executive is equal in power to other top-level hospital executives.
5. Their hospital chief nurse executive is accessible to staff.

NDNQI-Adapted Job Enjoyment Scale

Nurses with whom I work would say that they:

Response options: strongly agree, agree, tend to agree, tend to disagree, disagree, strongly disagree.

1. Are fairly well satisfied with their jobs.
2. Would not consider taking another job.
3. Have to force themselves to come to work much of the time.

4. Are enthusiastic about their work almost every day.
5. Like their jobs better than the average worker does.
6. Feel that each day on their job will never end.
7. Find real enjoyment in their work.

Work Contextual Items

Unit RN Job Plans for Next Year

1. What are your job plans for the next year?

Response options: Stay in my current position, stay in direct patient care but in another unit in this hospital, stay in direct patient care but outside this hospital, leave direct patient care but stay in the nursing profession, leave the nursing profession for another career, retire.

Unit Quality of Care

1. How would you describe the quality of nursing care for your unit on the last shift you worked?

Response options: excellent, good, fair, poor

2. In general, how would you describe the quality of nursing care delivered to patients on your unit? *Response options: excellent, good, fair, poor*

3. Overall, over the past year what has happened with the quality of patient care on your unit?

Response options: improved, remained the same, deteriorated

Unit Orientation and Hospital Recommendation

Please indicate the degree to which you agree or disagree with the following statements:

Response options: strongly agree, agree, tend to agree, tend to disagree, disagree, strongly disagree.

1. I received an orientation that adequately prepared me for my current position.
2. I would recommend this hospital to a friend as a place of employment.

Description of Unit Last Shift

Response options: strongly agree, agree, tend to agree, tend to disagree, disagree, strongly disagree

1. Some important things just didn't get done for patients.
2. Overall, I had a good day.
3. My patient care assignment was appropriate, considering both the number of patients and the care they required.

New Items in 2006:

On the most recent shift you worked:

Response options: shared one patient with another nurse, 1 patient....24 patients, > 24 patients, assignment not based on number of patients, no patient assignment.

4. What was the maximum number of patients assigned to you at any one time?
5. What was the total number of patients assigned to you over your entire shift?

Situations on Unit Last Shift

Think about the last shift that you worked. Did any of the following situations occur?

Response options: yes, no, not applicable.

1. I had enough help to lift or move patients.
2. I didn't have enough time to document care.

3. I had enough time to spend with each patient.
4. Inadequate staffing either prevented or resulted in patient admissions, transfers, or discharges.
5. Discharged patients (or their caregivers) were prepared adequately for home care.

Breaks on Unit Last Shift (new items in 2006)

1. On your last shift, how many hours did you work?
2. Select the most appropriate description of your meal breaks on your last shift.
Response options: I was not able to sit down for a meal during the shift, I was able to sit down for a meal during the shift but was not free of patient responsibilities, I was able to sit down for a meal and was completely free of patient responsibilities.
3. On your last shift, what was the total duration of your meal break(s)?
Response options: ≤15 minutes, 16-30 minutes, 31-45 minutes, 46-60 minutes, 61-75 minutes, 76-90 minutes, 91-105 minutes, 106-120 minutes, >120 minutes.
4. Select the most appropriate description of your breaks (other than meal breaks) on the last shift you worked.
Response options: I was not able to sit down for a break during the shift, I was able to sit down for a break during the shift but was not free of patient responsibilities, I was able to sit down for a break and was completely free of patient responsibilities
5. On your last shift, what was the total duration of your breaks (other than meal breaks)?
Response options: ≤15 minutes, 16-30 minutes, 31-45 minutes, 46-60 minutes, 61-75 minutes, 76-90 minutes, 91-105 minutes, 106-120 minutes, >120 minutes.

Usual Shift and Shift Rotation of Unit RNs

1. Which of the following best describes the shift you USUALLY work?
Response options: day shift, evening shift, night shift, no USUAL shift.
2. Which of the following best describes your USUAL shift rotation?
Response options: I do not usually rotate; I rotate between day and evening shifts; I rotate between day and night shifts; I rotate between evening and night shifts; I rotate between day, evening, and night shifts.

New Item in 2006:

3. How much influence do you have over the hours or schedule that you work?
Response options: Very little, little, moderate, much, very much

Floating of Unit RNs in Last Two Weeks

1. Over the last 2 weeks that you worked, how many hours did you work on a unit other than your permanently assigned unit?
Response options: not assigned to a specific unit, 0-only worked on my regular unit, less than 8 hours, 8-16 hours, more than 16 hours.

New Item in 2006:

2. Over the last 2 weeks that you worked, how many hours did you work on a unit outside your area of clinical competency or skills?
Response options: not assigned to a specific unit, 0-only worked on my regular unit, less than 8 hours, 8-16 hours, more than 16 hours.

Unit RNs Working Extra Hours

1. Think about the last time you worked extra hours or overtime. Why did you work the extra time? Choose one response.

Response options: I have not worked extra recently, I wanted the extra money, the unit was busy and I wanted to help, the unit was short-staffed and I wanted to help, I felt pressured by other staff, I was required to work by my manager or a supervisor, other.

2. Over the past year, what has happened about the amount of overtime needed from RNs on your unit? *Response options: increased, remained the same, decreased, don't know.*

RN Demographic Items

Average Unit RN Gender, Race, Age, Role, and Job Situation

1. What is your gender?

2. To which racial/ethnic category do you belong (check the one best answer)?

Response options: Asian, Black or African American, Hispanic/Latina(o), White/Non-Hispanic, Other

3. What is your age?

4. What is your role?

Response options: staff nurse, clinical nurse specialist, case manager, nurse practitioner, other

5. Select the most appropriate description of your job situation:

Response options: regular, permanent full-time employee of hospital (>=36 hours per week, regular, permanent part-time employee of hospital (<36 hours per week), PRN or Per-Diem employee of hospital, contract or agency employee.

Average Unit RN Tenure

1. How many years have you been employed as an RN on your current unit?

2. How many years have you worked as an RN in the United States?

3. If you received your basic RN education outside the United States, how many years did you work in an RN-equivalent position before coming to the United States?

Average Unit RN Certification and Education

1. Are you currently certified for specialty practice by the American Nurses Association or a national nursing specialty organization? (Do not include American Heart Association competencies, such as CPR, ACLS, or PALS, and do not include internal hospital certifications.) *Response options: yes, no*

2. Where did you receive your basic RN education?

Response options: In the United States, Outside of the United States

3. What is your highest level of nursing education?

Response options: diploma, associate degree, baccalaureate degree, masters degree, doctorate degree.

4. What is your highest level of education other than nursing?

Response options: no degree other than nursing, associate degree, baccalaureate degree, masters degree, doctorate degree.

Selected Individual-level Job Satisfaction Items

Response options: strongly agree, agree, tend to agree, tend to disagree, disagree, strongly disagree.

1. My present salary is satisfactory.
2. Physicians at this hospital generally appreciate what I do.
3. There is ample opportunity for me to participate in the administrative decision-making process.
4. I have sufficient time for direct patient care.
5. I need more autonomy in my daily practice.
6. There is a good deal of teamwork between my coworkers and me.
7. I am satisfied with the status of nursing in the hospital.
8. I am fairly well satisfied with my job.
9. I have career development opportunities.
10. My nurse manager is a good manager and leader.
11. I am satisfied with the hospital chief nurse executive.

References

- Aiken, L., & Patrician, P. A. (2000). Measuring organizational traits of hospitals: The Revised Nursing Work Index. *Nursing Research*, *49*, 146-153.
- Brayfield, A., & Rothe, H. (1951). An index of job satisfaction. *Journal of Applied Psychology*, *35*, 307-311.
- Stamps, P. (1997). *Nurses and work satisfaction: An index for measurement*. Chicago: Health Administration Press.
- Rogers, A. E., Hwang, W., & Scott, L.D. (2004). The effects of work breaks on staff nurse performance. *Journal of Nursing Administration*, *11*, 512-519.
- Taunton, R.L., Bott, M.J., Koehn, M.L., Miller, P.A., Rindner, E., Pace, K., Elliott, C., Bradley, K.J., Boyle, D., & Dunton, N. (2004). The NDNQI-Adapted Index of work satisfaction. *Journal of Nursing Measurement*, *12*, 101-122.

2-28-06

©February 2006 NDNQI – All rights reserved.

APPENDIX C

RN Survey Coordinator 2006 Web Data Collection Protocol



RN Survey Coordinator 2006 Web Data Collection Protocol

Web address for pilot testing: www.nursingquality.org/pilot
 Web address for RN participants: www.nursingquality.org/survey

Preliminary Preparation

Participating facilities must identify a Survey Coordinator within their facility. Survey Coordinators must read thoroughly the Data Collection Protocol, Timeline, and instrument options before making an informed decision regarding participation. You will find all these materials on the Survey Coordinator Webpage (www.nursingquality.org→member log-in→ Main Menu→Survey Coordinator Webpage→ Protocol/Survey Materials). Once the decision has been made to participate, the Survey Coordinator should begin the preliminary preparation activities described below. NOTE: Units must be enrolled by the Survey Registration/Unit Enrollment Deadline.

1. Confirmation of the web data collection system in your hospital

A successful survey requires Survey Coordinators to collaborate with their hospital's information technology staff.

You will need to:

Download the RN Survey IT Guidelines (*Survey Coordinator Webpage*→ *Protocol/Survey Materials*), distribute to your hospital's IT staff, use to discuss the survey.

a) Survey IT Guidelines

- Browsers
- HTTP Port
- Internet restrictions
- Inactivity time-out settings
- Printers (optional)
- Link to the survey (optional)

b) Additional survey requirements

- HELP Desk Support
Your hospital's computer Customer Support HELP desk must be aware of the survey and able to assist participants who call with common problems, such as (1) no Internet connection, (2) your hospital's Internet firewall blocks

- access to survey, (3) your hospital's Internet timeout setting blocks participants from submitting survey, (4) participants type in the survey address incorrectly, or (5) participants type in your hospital's Survey code incorrectly. Your Customer Support HELP desk can call NDNQI at 913-588-1691 for assistance with troubleshooting.
- Designated survey computers.
You must ensure that all eligible participants have access to computers with Internet connections.
 - A sufficient number of computers must be available in private settings so that RNs will not be interrupted during the survey (20-30 minutes for the survey or 10-15 for the short form). Because this is an anonymous survey, participants cannot save partial responses to finish later. Computers that are not used routinely for patient functions—on the patient care unit, the library, or a staff development area--may be designated.
 - Computers must have Internet access. Internet browsers, restrictions, and inactivity time-out settings must meet the RN Survey IT Guidelines.
 - A local or network printer is needed if you decide to use the "Certificate of Participation" in an incentive program. This certificate is available at the end of the survey for RNs to print. (see Section #3 of this protocol)
 - Nurses should be assured that they have the option to complete the survey at any available computer with an Internet connection, including their home computers.
 - Pilot Test
See Section #6 of this protocol.

2. Institutional Review Board Approval

You will need to:

Investigate and comply with the policy of the Institutional Review Board (IRB) at your facility. The NDNQI RN Survey Data Collection Protocol is reviewed annually for human subject protection by our IRB. Each year the protocol has been found exempt from full review because participants cannot be identified. Relevant documents from our IRB review are available at the Institutional Review Board link (*Survey Coordinator Webpage*→*Protocol/Survey Materials*→*Institutional Review Board*) to support you in this effort.

3. Develop Recruitment Plan

RN Survey Eligibility Criteria:

Eligible RNs are full or part-time, regardless of job title, who spend at least 50% of their time in direct patient care, and have been employed a minimum of 3 months on the unit (unit based PRN or per-diem nurses employed by the hospital are eligible; agency or contract nurses are not eligible). See NDNQI Data Collection Guidelines for direct patient care definition.

A high unit response rate is needed for protection of anonymity of participants and for confidence in the validity of your results. As most participants will respond early in the data collection period, response rates of 35-40% by the end of the first week,

and 55-60% by the end of the second week are needed to achieve an overall 70%, which is the generally accepted response rate for survey research.

The confidence of RNs in the procedures established by both NDNQI and by your hospital to protect the anonymity and confidentiality of their responses is essential. You will distribute an invitation letter to eligible RNs from NDNQI and a separate invitation letter from your hospital addressing these concerns. Both letters are described below. Eligible RNs must be assured that the names of RNs who participate are not listed or tracked in any way, that responses will be anonymous, that participation is voluntary, and that jobs will not be affected by participation or nonparticipation.

The RN Survey Data Collection Protocol was designed to ensure that survey responses are not and cannot be linked to individual nurses in any way. NDNQI will not report data at the unit level for units with less than 5 respondents. NDNQI will not report data at the unit level that have the potential to reveal the identity of participants, such as RN characteristics and education.

You will need to:

a) Obtain administrative support.

The support of hospital and nursing administration, as well as unit management, is essential to the success of your recruitment. The timing and fit of this survey with other internal staff surveys must be considered. It is the responsibility of the Survey Coordinator to ensure that the administration and management team of your hospital understands that tracking names of participants in any way or linking participation to performance evaluations in any way would be an unethical violation of the human rights of survey participants.

b) Recruit a partner on each unit.

The assistance of a partner will be invaluable for unit recruitment activities. The larger the hospital, the more essential this partner will be. This could be a nurse manager, a staff nurse, or someone else. The ideal unit partner is an interested RN who is eligible for the survey and who is not part of the management team.

c) Establish incentives.

Two keys to recruitment are the confidence of RNs in the anonymity of their responses and clear communication to RNs of administrative and management support for the survey. We encourage you to consider that sharing with eligible RNs the reasons your administration chose to conduct this survey and how your administration plans to use the results could be important participation incentives. You may also consider that RNs are more likely to participate if they know that the survey results will be shared with them.

A system of incentives is needed to maximize RN participation. A system of both individual-level and unit-level incentives has been shown to significantly improve response rates.

- Establish individual-level incentives.

These are for all RNs who participate. Possibilities for individual-level incentives include meal tickets or entry into drawings for gift certificates or other prizes. To protect anonymity and confidentiality, the names of nurses who participate must not be tracked or listed in any way.

For individual level incentives, a “proof of participation” system can be created that maintains the confidentiality of participants. When RNs complete the survey and click “submit” they will be given the option of generating a “certificate of participation.” This certificate will contain a unique participation number that is not linked to the data in any way. The participant can either print the certificate or write down the number. The certificate is designed in 2 parts, one part is for the participant to keep and the second part is for submitting as proof of participation, in exchange for individual-level incentives.

RNs must be assured that the participation number cannot be linked to their individual response. It is essential that a neutral person be responsible for collecting “proof of participation” certificates and for distributing individual incentives. Examples of neutral persons are clerical personnel in nursing education or the library; no one in administration or management should be considered neutral. Proof of Participation certificates are only to be used for individual incentives. The use of these certificates to list or track participants in any way would be an unethical violation of the human subject rights of participants.

- Establish unit-level incentives.
These are for the units with response rates that reach a specified level, or for the unit with the highest response rate. Possibilities for unit-level incentives include such things as a unit journal subscription or pizza for all nurses on all shifts. A two-tiered reward system could be devised in which you provide a small award to units that achieve a 50% response rate and a better award to units that achieve a 70% response rate. Remember, unit level findings will only be reported for units with 5 or more respondents.

The Survey Response Rates Table (*Survey Coordinator Webpage*→*Survey Management*→*Survey Response Rates Table*) will provide continually updated unit response rates during data collection. By closely monitoring response rates during data collection, you will be able to identify units where additional recruitment efforts are needed, or to stimulate competition between units for unit-level incentives, with the help of unit partners.

d) Develop publicity plan

A variety of internal communication routes should be used, such as newsletters, posters, fliers on unit bulletin boards, mass emails, and staff meeting announcements.

4. Submit new units for NDNQI enrollment approval (if needed)

You can include RNs in the survey who work on any or all of your hospital's patient care units who meet the RN Survey Eligibility Criteria. You must know which units in your hospital are already enrolled in NDNQI. If you want to survey other units, you must first enroll them as new units in the NDNQI database, using the Unit Management webpage (*Main Menu*→*Unit Management*). You must submit new units for enrollment approval by the survey registration/unit enrollment deadline.

RN Survey Eligibility Criteria:

Eligible RNs are full or part-time, regardless of job title, who spend at least 50% of their time in direct patient care, and have been employed a minimum of 3 months on the unit (unit based PRN or per-diem nurses employed by the hospital are eligible; agency or contract nurses are not eligible). See NDNQI Data Collection Guidelines for direct patient care definition.

You will need to:

- a) Complete the 3 step enrollment process.
 - Prepare unit enrollment request
 - Submit unit enrollment request
 - Complete unit enrollment approval phone call.

Find detailed instructions in the NDNQI Data Collection Guidelines, under Unit Management and Appendix D (*Main Menu*→*Reports and Documents*→*Data Collection Guidelines*). You must collaborate with your hospital's NDNQI Site Coordinator to prepare the unit enrollment request. You must have a thorough understanding of the NDNQI Unit Structure (see NDNQI Data Collection Guidelines & Appendix D), your hospital's previously enrolled units, and the units you wish to enroll for the survey. You will need to collaborate with key staff within your facility with intimate knowledge of each unit, such as unit managers.

- b) Consider issues relating to unit enrollment
 - **Unit Names**
The names you use to identify each unit, including work group units, must be easily recognizable to RNs taking the survey. RNs will choose their unit from a drop-down list of the names assigned when units are enrolled. You must be aware that if RNs, particularly RNs in work group units, choose the wrong unit name when completing the survey, interpretation of your reports will be difficult.
 - **Work Group Units**
The RN Survey is designed specifically for unit-based nurses. All indicators included in the NDNQI, including the RN Survey, are measured and reported at the patient care unit level. Nurses who are not unit-based can be included in the Survey if they meet the RN Survey Eligibility Criteria and constitute an identifiable "work group" with a common culture. Examples include float nurses, IV Therapy Team nurses, transport team nurses, and non-unit based

nurse case managers, nurse practitioners, or clinical specialists. For these nurses, you need to enroll their “work group unit,” being certain to assign a name the nurses will recognize and select as their unit from the drop-down list of unit names when they take the survey. Assign this unit the patient population of “other, unit type of “other,” and specialty of “work group.”

If you choose to include non-unit based nurses, you must provide these nurses special instructions: (1) the name of the “work group unit” they should select for the survey, so that they do not select a unit they may otherwise identify with, and (2) the reference they should use to answer survey items that refer to their unit, or their nurse manager or supervisor. You will need to refer to specific items in the instrument to formulate these instructions.

- Number of eligible RNs on unit
You are not likely to receive unit level data reported for units with less than 8 eligible RNs, given a typical response rate, as unit-level reports are only provided for units with 5 or more respondents. You can combine small units or work groups if they reflect a common work group culture and are not eligible for any other indicator except the RN Survey. You should also consider what will be useful to the readers of your RN Survey Report. For example, all ambulatory care clinics could be combined as “Ambulatory Care.”

5. Registration of your hospital for the survey

You will need to:

Register on the web, using the Registration/Schedule tab (*Survey Coordinator Webpage*→*Registration/Schedule*). When you register you will receive an email confirming your registration.

6. Web Preparation Steps

Step 1. Select participating units.

Click Step 1: Select Units to Participate in Survey (*Survey Coordinator Webpage*→*Survey Management*→*Step1*) for a list of all the units enrolled in the NDNQI database for your hospital. You must select which units will participate in the survey from this list. After you have selected the units you want to survey, you must click the “Save” button at the bottom of the list. You will then find the units you selected on all tables on the Survey Management webpage. **Units must be selected before they can be pilot tested. You are not able to select or un-select units after the preparation deadline.**

Step 2: Enter number of eligible nurses on each unit.

You must enter each unit’s number of eligible RNs at Step 2. Determine the number of RNs eligible to participate using each unit’s payroll on the 1st day of the month two months prior to data collection (refer to the timeline for your specific date).

RN Survey Eligibility Criteria:

Eligible RNs are full or part-time, regardless of job title, who spend at least 50% of their time in direct patient care, and have been employed a minimum of 3 months on the unit (unit based PRN or per-diem nurses employed by the hospital are eligible; agency or contract nurses are not eligible). See NDNQI Data Collection Guidelines for direct patient care definition.

The eligibility criteria and survey items are designed to reflect a unit work group of direct patient care providers. The number of eligible RNs will be used to calculate unit response rates.

Click Step 2: Enter Number of Eligible RNs (*Survey Coordinator Webpage*→*Survey Management*→*Step2*). On the Eligible RNs Table you must add the number of eligible RNs on each participating unit. After you have entered the number of eligible RNs for one or more units, you must click the “Save” button at the bottom of the table. It is mandatory that the number of eligible RNs is changed from zero (0) to the correct number for each unit before the preparation deadline, or your hospital will be excluded from the chosen data collection period and will need to re-register for a later month. You will be able to edit this number until the end of your data collection period, although you cannot change this number back to zero (0) after the preparation deadline. You will see the number of eligible RNs you entered on the Survey Response Rates Table (*Survey Coordinator Webpage*→*Survey Management*→*Survey Response Rates Table*).

Step 3: Select your survey instrument.

Survey coordinators must choose a survey instrument prior to pilot testing. Click Step 3: Select Survey Instrument (*Survey Coordinator Webpage*→*Survey Management*→*Step3*). You can access a copy of each instrument from this webpage. After you have made your selection, you must click the “Save” button at the bottom of the webpage. The instrument available to you to pilot will be whichever you have selected. You can change your instrument selection until the preparation deadline.

Step 4: Conduct pilot tests.

a) Goals of pilot testing:

- Enable Survey Coordinators and their hospital’s computer support staff to identify and address anything (i.e., connectivity and inactivity time-out) that may affect the ability of your hospital’s computer system to support the RN web based survey—prior to your data collection period.
- Introduce the survey to individuals whom participants will go to with questions about survey items or how the survey website functions.

b) Pilot test issues:

- When should pilot testing occur?
 - Plan to complete pilot tests well before the preparation deadline to allow time for troubleshooting any problems that arise.
- What must be completed before pilot testing can begin?
 - Step 1: Select participating units
 - Step 3: Select survey instrument
- Who should pilot test?
 - The Survey Coordinator can complete all pilot tests or can coordinate pilot testing by others.
 - RNs who are eligible for the survey should not conduct pilot tests and should not know the pilot web address. This will prevent participants from submitting a pilot test thinking they are submitting a survey.
 - Anyone who is not eligible to take the survey can pilot test.
 - Individuals whom participants will go to with questions about survey items or how the survey website functions are ideal pilot testers.
- How is pilot testing conducted?
 - Pilot testers need the pilot web address (www.nursingquality.org/pilot) and your hospital's RN Survey Code. Survey Coordinators must locate the RN Survey Code in the yellow box on the Survey Management Tab (Survey Coordinator→Webpage Survey Management.) The Survey Coordinator can also access the pilot survey using the Step 4 link (Survey Coordinator Webpage→Survey Management→Step4).
 - The survey should be pilot tested on all designated data collection computers. The survey must at a minimum be pilot tested on at least one computer in every participating unit because computer policies, setups, and Internet access vary greatly between departments, units, or even computers in many institutions.
 - It is sufficient to respond to only one survey item and submit the survey to test connectivity between your hospital and NDNQI.
 - Be aware that inactivity time-out issues will not be revealed by responding to one survey item.
 - When a pilot test has been submitted from a unit, the Survey Coordinator must confirm that each pilot test is reflected in the Pilot Response Rate Table (*Survey Coordinator Webpage→Survey Management→Pilot Response Rates Table*). A large green check will appear on the Pilot Response Rates Table next to each unit on which a pilot test has been successfully conducted. It is mandatory that a green check appear for each unit before the preparation deadline, or your hospital will be excluded from the chosen data collection period and you will need to re-register for a later month.

- Addressing issues discovered during pilot testing
 - Contact your hospital's computer support staff to assist with identifying and addressing any problems that arise. If needed, your computer support staff can contact NDNQI at 913-588-1691 for assistance with troubleshooting.
 - Any issues that are not addressed during pilot testing can create frustrations for participants which may decrease your hospital's response rate.

7. Prepare and distribute invitation letters to eligible RNs

You will need to:

- a) Prepare and reproduce your hospital's Invitation Letter to eligible RNs. You will need to prepare your hospital's Invitation Letter and reproduce it in sufficient quantity for distribution to all eligible RNs. Click on the Example Invitation Letter From Your Hospital (*Survey Coordinator Webpage*→*Protocol/Survey Materials*→*Web Survey Recruitment Materials*→*Example Invitation Letter From Your Hospital*), which you will need to personalize for your hospital.

You must include the following information in your hospital's invitation letter:

- Procedures in place at your hospital to protect anonymity and confidentiality.
- Your name (as the Survey Coordinator), phone number and email address (or other designee) as the person at your hospital for RNs to contact with questions or concerns about the survey.
- Instructions to call your hospital's HELP desk if they experience problems accessing or submitting the survey (include HELP desk phone number).
- Location of computers designated for the survey
- Dates and hours survey is available, including deadline to submit responses. Find your data collection period in the yellow box on your Survey Management Tab (*Survey coordinator Webpage*→*Survey Management*). All data collection periods begin Monday morning at midnight, Central Standard Time and end 3 weeks later on Sunday night at Midnight, Central Standard Time.
- Username & passwords for hospital computers and Internet Access, as required by your hospital.
- RN Survey web address (www.nursingquality.org/survey)
- Your hospital's RN Survey Code. Find your code in the yellow box on your Survey Management Tab (*Survey Coordinator Webpage*→*Survey Management*).
- After successfully submitting the survey, participants will be given this message: Thank you! Your survey has been submitted successfully.
- Participation incentives established in your hospital.
- Any other procedures specific to your hospital (i.e., what, if anything,

to do with the “Certificate of Participation”).

- b) Reproduce NDNQI Invitation Letter to eligible RNs.
The NDNQI Invitation Letter explains the purpose of the survey, lists the survey web address, and outlines our agreement with RN participants that responses will be anonymous, that participation is voluntary, and that jobs will not be affected. You will need to download the NDNQI invitation letter (*Survey Coordinator Webpage*→*Protocol/Survey Materials*→*Web Survey Recruitment Materials*→*Invitation Letter from NDNQI*) and reproduce it in sufficient quantity for distribution to all eligible RNs on all participating units.
- c) Distribute Invitation Letters together.
Attach the Invitation Letter from your hospital to the NDNQI Invitation Letter and distribute them together to all eligible RNs via hospital mail boxes the week prior to data collection.

During Data Collection:

8. Recruitment continues.

You will want the continued assistance of your unit partners in this effort.

You will need to:

- a) Continue to publicize the survey, using a variety of communication strategies.
- b) Administer individual-level participation rewards as planned.
This was described above under “establish individual-level incentives.”
- c) Monitor and use unit response rates to target recruitment efforts.
Monitor unit response rates using the Survey Response Rates Table (*Survey Coordinator Webpage*→*Survey Management*→*Survey Response Rates Table*). Low unit response rates will suggest the need for additional recruitment activities. The recruitment efforts of unit partners may be the most effective efforts made during data collection. As most participants will respond early in the data collection period, response rates of 35-40% by the end of the first week, and 55-60% by the end of the second week are needed to achieve an overall 70%, which is the generally accepted response rate for survey research. Unusually high response rates, particularly response rates >100%, will identify other sorts of problems, such as participants unable to identify their unit (the most common problem, particularly for nurses in “work group units”), errors in the estimated number of eligible RNs, ineligible participants, or persons participating more than once.
- d) Distribute reminders at the beginning of the 2nd and 3rd weeks of data collection.
 - Download reminders.
We have provided a First RN Reminder and a Second RN Reminder postcard (*Survey Coordinator Webpage*→*Protocol/Survey Materials*→*Web Survey Recruitment Materials*→*First and Last RN Reminder*).
 - Add your hospital’s RN Survey Code to the postcards before reproduction.

- Reproduce reminders.
Reproduce the reminders in sufficient quantity for distribution to all eligible nurses on the participating units.
- Distribute First Reminder.
All eligible RNs should receive the first reminder on the first Monday of the second week of data collection in their hospital mail box.
- Distribute Last Reminder.

All eligible RNs should receive the last reminder on the first Monday of the third week of data collection in their hospital mail box.

After Data Collection:

9. Distribution of participation rewards.

You will need to:

Identify and distribute individual and unit participation rewards.

It is important to follow through on the planned reward system as soon as possible, as this can significantly effect recruitment for future RN Survey data collections.

10. Download reports.

An Initial Survey Report and a Final Survey Report will be posted on the RN Survey Reports webpage (*Main Menu*→*Reports and Documents*→*RN Survey Reports*). The Initial Report will be posted within 4 weeks of the end of your data collection period, and will include your 2006 responses and 2005 comparison data from all hospitals that participated last year. The Final report will be posted by end of December, and will include your 2006 responses and 2006 comparison data from all hospitals participating this year. Both reports will be posted as PDF files and as excel spreadsheets. We created the spreadsheets to provide you flexibility in formatting reports to fit the specific needs of your facility.

RN Survey National Comparison Reports are available for you to download from the RN Survey Reports webpage. In addition to comparison data, your report will include your hospital's data summarized at both the hospital and unit level for the RN Survey Instrument scales, as well as items regarding perceptions of quality of care, floating, and overtime. Unit level data is not provided for units with fewer than 5 responses, although the responses from these units will be included in the hospital level data reported. We provide only hospital level data for RN characteristics (demographics, years in practice or on unit), credentials, or job plans, to assure that participation or nonparticipation of individuals is not revealed.

APPENDIX D

Letter of Invitation to Participate in Survey from NDNQI to RNs



Dear Registered Nurse:

We invite you to participate in the 2006 NDNQI RN Survey. The National Database of Nursing Quality Indicators (NDNQI) offers the survey to direct care nurses in member hospitals. As a member, your hospital has chosen to participate. 144,207 RNs from 382 hospitals in 48 states responded last year, the 4th year of this annual survey. You will receive specific information about how to take the survey from your hospital's survey coordinator. Please ask your manager who that is.

Your opinion is very important to us. We need to hear from everyone to obtain an accurate picture of the RN work climate on every participating unit in your hospital. Because the primary focus of the survey is on nursing care units, some questions ask for your opinion about the perceptions of the RNs on your unit rather than your own perceptions. We will use your responses to learn more about the climate in which RNs work and patients receive care. We estimate it will take you about 20 minutes to complete the survey.

Your responses will be anonymous. Because you do not provide your name and the completed questionnaire is submitted directly to NDNQI, there is no risk that your responses could be linked to you. We will send a report to your hospital that summarizes the data for the entire hospital as a whole, and summarizes some data for individual units. To protect your confidentiality, we do not report personal characteristics (such as age, sex, education) for individual units, nor do we report data for units with 4 or fewer responses.

Participation in this survey is voluntary. If you choose not to participate, your job will not be affected. You can contact Dr. Nancy Dunton, NDNQI Principle Investigator, with questions about the study at ndunton@kumc.edu or 913- 588-1456. If you have questions about your rights as a research subject, call (913-588-1240) or write the Human Subjects Committee, University of Kansas Medical Center, 3901 Rainbow Boulevard, Kansas City, KS, 66160-7700.

For questions about taking the survey, contact your hospital's survey coordinator. For any other questions or concerns about this study or the confidentiality of your responses, contact me at ndnqi@kumc.edu or 913-588-1648.

Thank you for your participation!

Sincerely,

A handwritten signature in black ink that reads "Peggy Miller".

Peggy Miller, RN, MS
Director, NDNQI RN Satisfaction Survey
913-588-1648

APPENDIX E

KU School of Nursing Student Research Scientist Agreement

**KU School of Nursing
Student Research Scientist Agreement**

Student Research Scientist	Peggy Miller
Project	National Database of Nursing Quality Indicators (NDNQI) at the University of Kansas School of Nursing (KUSoN)
Principal Investigator	Nancy Dunton, PhD
Project Faculty/Co-PI	Diane Boyle, RN, PhD
Contract Term	From Nov 1, 2006 to Nov 1, 2008

1. Purpose. The purpose of this Agreement is for the use of the dataset from the National Database of Nursing Quality Indicators (NDNQI) as a student research scientist enrolled in the nursing doctoral program at the University of Kansas, School of Nursing. I will be using the data for my dissertation research (NRS 990/999 Doctoral Research/Dissertation).
2. Objectives. The objectives of this course require me to:
 - 1) Secure a dataset;
 - 2) Develop research questions to guide the data analysis;
 - 3) Critically analyze the data using the appropriate analysis software; and
 - 4) Write up the findings in a format that could ultimately lead to a publication of the findings.
3. Use of Dataset. For this project I will be using the dataset to complete dissertation research testing a model of RN workgroup intention to stay on the job
4. NDNQI Oversight. It is my understanding that the project faculty and/or project staff will assist me in obtaining the files and clarify questions related to cleaning the data. The Principal Investigator, Co-PI, and/or Project Staff will assist me in the review of the data analysis, the interpretation of the results, and the presentation of the findings.
5. Confidentiality. In exchange for my participation as a student research scientist on the NDNQI project, I agree that I will not disclose any part of the data, data analysis, and/or findings resulting from the performance of this Agreement to any other person(s) other than the Principal Investigator, Co-PI (dissertation chair), Project Staff, and Marge Bott, PhD.
6. Intellectual Property. I understand that the student academic creation and any associated intellectual property are normally in the hands of the creator under University policy. However, in exchange for my participation as student research scientist on the NDNQI project, I understand that the NDNQI database and American Nurses Association (ANA) Indicators (both currently in use, future newly developed indicators, or modifications of existing indicators) are subject to the ownership and control of ANA, and all right, title and interest in the ANA Indicators is solely vested in ANA. Further, I understand that if my analysis contributes in any way to the development of any one or more "ANA Indicator(s)" ("Invention") for the NDNQI,

National Database of Nursing Quality Indicators
Principal Investigator: Nancy Dunton, PhD

the indicators are considered ANA Indicators, and I hereby assign all right, title and interest to such ANA Indicator to ANA. "ANA Indicator(s)" shall mean those indicators that are or have been developed or modified as part of any work performed as part of any agreement between ANA and KUMCRI or otherwise at ANA direction or expense and shall include any Derivative Works of any Publicly Available Indicators developed or modified at ANA direction or expense. The copyright to any publication or other creation, excluding the ANA Indicators shall remain with the creator under University policy, as provided in the Student Handbook under Research Activities, <http://www.kumc.edu/studenthandbook/general.html#research> and the University Policy on Student Academic Creations.

7. Publication. In the event that I desire to publish and/or present my findings, I will first seek permission and feedback from the Principal Investigator and /or Project Faculty, who will be listed as co-authors on the publication or presentation. In the event that I do not publish my findings or results and the Principal Investigator, Co-PI, and/or Project Staff are interested in publishing based on my work, I give my permission for them to publish my findings.

8. Compliance Training. I certify that both the required human subjects compliance (HSC) training/tutorial and the required Health Insurance Portability and Accountability Act (HIPAA) training/tutorial are current and complete as of the date below.

9. Deletion of Files. Upon completion or termination of the project, I will delete the file set from my personal computer and return all the data files (in whatever format, paper or electronic) to the NDNQI project.

10. Termination; Survival. This Agreement may be terminated at any time by the Principal Investigator and/or Project Staff for any reason. Sections 5, 6, 7 and 9 above shall survive the termination of this Agreement.

By my signature below, I acknowledge and agree to the above terms:

Peggy Miller 10-11-2006
Name: Peggy Miller Date
Student research scientist

Nancy Dunton 10-11-2006
Name: Nancy Dunton, PhD Date
Principal Investigator

Diane Boyle 10-11-2006
Name: Diane Boyle, RN, PhD Date
Co-PI

APPENDIX F

Certificate of Human Subjects Protection Training Completion

[Back](#)
[Print Certificate](#)

Certificate of Training Completion

This certificate is a record that
Peggy Miller

successfully completed the quiz
2006 Human Subjects Refresher

for the online training course:
Human Subjects Protection

on this date:
Thursday, March 16, 2006