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Nurse Working Conditions and Nursing Unit Costs

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In an environment of high nursing turnover and worsening nursing labor shortages, health care executives are realizing the value of positive working conditions to their employees and to the organization's financial performance. Such working conditions are those in which nurses have autonomy, participate in decision-making, and communicate and coordinate with other health care professionals who are involved in providing patient care (Mark et al., 2007; Warren et al., 2007; Ulrich et al., 2007). Recent studies indicate that working conditions are related to improvements in patient safety, including the detection of medication errors (Seki & Yamazaki, 2006), and reductions in infections (Stone et al., 2007), mortality (Havens & Aiken, 1999) and decubitus ulcers (Stone et al., 2007). Organizational outcomes such as higher job satisfaction (Zelauskas & Howes, 1992; Havens & Aiken, 1999; Warren et al, 2007), lower intent to leave (Stone et al, 2007), and better employee safety outcomes (Stone & Gershon, 2006; Warren et al., 2007) have also been reported. Similar results have been found in Magnet™ hospitals, known partly because of their good work environments for nurses (McClure et al., 2002).

Creating positive working conditions requires a commitment of management and personnel, and the development of a corresponding infrastructure to support such an environment. These commitments represent potential costs to the organization in terms of both time and resources, yet we know very little about specific aspects of working conditions that might contribute to these costs. In an attempt to better understand how working conditions contribute to nursing unit costs and, in turn, inform unit and organizational policy-making, we modeled these costs as a function of working conditions for nurses, after controlling for hospital, unit, and patient characteristics.

Background

Interest in the impact of nurses' working conditions on costs can be traced to early investigations of nursing professional practice models. For example, Zelauskas and Howes (1992) examined the effects of implementing a professional practice model – defined as a unit-based governance system that empowered nurses through improved autonomy, accountability, and control over the care delivery environment – on nursing unit cost per patient day, sick time use and turnover rates. This descriptive study was conducted at a single hospital by comparing a professional practice model unit to a control unit. Data about salary and non-salary costs, sick time use, and turnover rates were collected prior to implementation of the model, and then at 6 months, 12 months, and 30 months after implementation. The professional practice model salary cost per patient day increased from \$112 at baseline to \$121 after 12 months and to \$138 after 30 months. In contrast, salary cost per patient day on the control unit changed from \$142 at baseline to \$141 after 12 months and \$140 after 30 months. Non-salary costs such as those for medical-surgical

supplies, printing paper, and telephones also declined slightly on the experimental unit post-implementation as did sick time use and turnover rates.

In another descriptive study, Witzel et al. (1996) investigated the effect on nursing unit level costs of an enhanced professional practice model that incorporated strategies to improve staff nurses' control over practice, collaborative working relationships, continuity of care, rewards/compensation based on education and experience, and continuing education based on unit needs. Changes in working conditions were introduced on five general medical-surgical units: one in a rural hospital, two in community hospitals, and two in urban medical centers. Data from these five units, collected at baseline and trended for 3 years, were compared to control units that did not experience changes in professional practice. Costs were defined as average registered nurse (RN) costs per patient day. Average total costs and RN costs in constant dollars were reported for the experimental and comparison units. The findings indicated that the professional practice model enhancements to increase unit-level decision-making and accountability for practice were no more costly than other models.

More recently, Sales et al. (2008) investigated the association between nursing unit costs and nurses' perception of the practice environment in Veterans Administration (VA) Medical Centers. The researchers collected data in 2003 from 794 RNs in 99 acute, inpatient medical-surgical units at 67 VA medical centers. Information was gathered on RNs' perceptions of participation in decision-making, manager ability/leadership/support of nurses, staffing/resource adequacy, and nurse-physician relations. Costs were measured in two ways: total variable costs per day and nursing variable costs per day. After controlling for staffing levels, nurses' perceptions of the professional practice environment were not significantly associated with unit-level patient care costs. However, the limited generalizability of this study beyond its VA setting is of concern.

The studies reviewed here suggest that positive working conditions have a minimal impact on unit costs, if there is any effect at all. However, these studies used small samples, lacked controls for other important cost drivers, and had limited generalizability. Our study addressed these limitations by examining the relationship between working conditions and nursing unit costs in a large, nationally representative sample of nursing units in general acute care hospitals. We controlled for other factors that research has shown to be associated with nursing unit costs.

Conceptual Framework

We conceptualized nursing unit costs as a function of working conditions, hospital characteristics, nursing unit characteristics and patient characteristics. Two arguments can be set forth regarding nurse working conditions and nursing unit costs. The first, which addresses organizational preconditions for good working conditions, rests on an assumption that good working conditions will be costly for the organization. For example, by investing in management and personnel time and salaries, and the supporting structures needed to improve working conditions, organizations must expend funds they might invest in other organizational programs, services, or strategies. The other argument, which addresses the consequences that may result from a *lack* of good working conditions, is that bad working conditions are also costly -- in terms of productivity losses, absenteeism, and turnover. In this case, investments to improve working conditions may actually lower or offset other unit or organizational operating costs. Because we were interested in the organizational preconditions for good working conditions rather than the consequences of bad working conditions, the conceptual model illustrated in Figure 1 was developed to guide our study. Rather than using an economic theory and a traditional production function or microcosting approach to examine costs, we elected to include in our model those input variables that the

literature suggests might be related to nursing unit costs. We recognize the risk of omitted variable bias inherent in our approach but believe that the risk is no greater than we might otherwise encounter using a more traditional framework.

We included in our model selected hospital, nursing unit and patient characteristics that were thought to have a relationship to nursing unit costs. For example, *hospital size* was included because larger hospitals have more total FTEs per occupied bed, more overtime hours, and higher total expense per adjusted discharge (“Analysis reveals ...”, 2007), which may be reflected in higher nursing unit costs. *Teaching status* was included because teaching hospitals are known to have higher costs per case (Newhouse, 2003) and have been found to have higher RN costs per patient day (Welton, Unruh and Halloran, 2006). We included the hospital's Medicare *case mix index*, because it reflects the intensity of patient resource demand, which is then translated into need for nursing care and perhaps additional staff. Finally, hospitals that have achieved *Magnet status* may have higher nurse to patient ratios, and therefore increased nursing unit costs (Aiken, Smith and Lake, 1994; Welton, Unruh and Halloran, 2006).

The nursing characteristics we included were unit size, the availability of support services, nursing workload, RN educational level, RNs' tenure on the unit and nurse staffing. *Unit size* can affect nursing unit costs through a variety of mechanisms that affect workflow processes. One of these is the physical layout of the unit, including whether patient rooms are private or semi-private, where the nursing station is located in relation to the majority of patient rooms, the distance nurses must walk in providing care to their patients, and the location of equipment and supplies needed for patient care. A large nursing unit that is efficient from an architectural perspective may require fewer nursing staff than a less efficiently designed unit (Hendrich, Chow, Skierczynski et al., 2008). In addition, the extent to which a unit realizes volume advantages and more efficient staffing by treating a large number of similar patients may also affect unit costs (Rimar and Diers, 2006). The *availability of support services*, such as housekeeping, computerized order entry systems, or patient transportation, may reduce the work demands on nurses, thereby decreasing unit costs. Nurses' *workload* can impact costs, as units with higher workloads, i.e., those where nurses care for a greater number of patients, may incur lower nursing unit costs by allowing the unit to maintain a smaller nursing workforce, use fewer supplemental staff, and less overtime. However, studies have also reported that higher nursing workloads are associated with more adverse patient events (Aiken et al., 2002), which may prove costly over the long-run. The *educational level of RNs on the unit* may be associated with nursing unit costs because nurses with a baccalaureate or higher degree have been shown to earn higher wages than those with a diploma or associate degree, suggesting that employers may be willing to pay a wage premium for bachelors' prepared nurses (Jones and Gates, 2004). *Tenure on the unit* was included because staff nurses who have gained experience with a particular group of patients and a stable group of physicians are likely to have highly refined skills that may affect a unit's demand for nurses, and thus costs. Finally, *nurse staffing* with a greater proportion of RNs is likely to be associated with nursing unit costs because RNs are typically paid higher salaries. However, Needleman et al., (2006) reported that increasing RN hours without increasing the total hours of licensed staff was associated with a net reduction in costs, while increasing the number of nursing care hours per day for both RNs and LPNs was more costly.

We included the patient characteristics of *gender, age, education, and health status* because men, elderly patients, those that are less well educated and have poorer health status may experience greater severity of illness than their counterparts (Iezzoni, 2003) thereby increasing demand for nurse staffing, supplemental staff and/or overtime, and, in turn, nursing unit costs.

Methods

Design and Sample

The data for this analysis were collected as part of the Outcomes Research in Nursing Administration II (ORNA –II) project, a longitudinal, causal modeling multi-site study designed to investigate relationships between hospital context and structure and organizational, nurse, and patient outcomes (Mark et al., 2007). Data were collected in 2003 and 2004 from 286 medical, surgical or medical-surgical nursing units in 146 U.S. acute care hospitals. Hospitals were randomly selected from the 2002 American Hospital Association Guide to Hospitals after excluding federal, for-profit or psychiatric facilities and hospitals with fewer than 99 beds.

Because of missing data on selected variables, our analysis is based on a sample size of 210 nursing units in 112 hospitals. There were no statistically significant differences between these 210 units and the larger sample of 286 units on any of the variables included in our analysis.

Measures

Table 1 provides a summary of study variables, definitions and data sources. *Working conditions* was defined as nurses' perceptions of the extent to which they engaged in autonomous professional practice, participated in decision-making, and the extent of relational coordination on the unit. Working conditions was measured as the aggregated standardized factor-based scores obtained from three instruments completed by RNs on the unit; higher factor scores and higher scores on each individual instrument indicated better working conditions. All of the scales have acceptable psychometric properties (Mark et al., 2007). Autonomy was measured by the 16-item Control over Nursing Practice Scale, as modified by Gerber (1990). This tool assesses the extent to which nurses believed they could engage in consultation with others about complex care problems, influence the care received by their patients, and act on their own decisions. Items were rated on a 6-point Likert-type scale. Participation in decision-making was measured with a 6-item, 5-point Likert-type scale on which nurses rated their involvement in unit decisions (Mark & Hagemueller, 1994; Mark et al., 2007). Relational coordination was measured using the Relational Coordination Scale (Gittell et al., 2000), a five-point Likert-type scale on which coordination with other members of the health care team was rated in terms of communication and relationship quality. Communication quality included frequency, timeliness, accuracy, and problem solving, while relationship quality addressed the extent to which team members shared goals and knowledge, and demonstrated mutual respect. For this composite variable, higher scores represented "better" working conditions.

Nursing unit costs were measured as the salaries (including fringe benefits) for worked hours over a six month period of time for the following nursing personnel involved in direct patient care: RNs, LPNs and unlicensed personnel permanently assigned to the unit; supplemental nursing personnel employed on the unit; and overtime for nursing unit personnel. To derive a measure of cost per patient day, the total of these salary costs were then divided by the number of patient days reported for each nursing unit for the same six month time period. We did not include fixed costs, supply costs or capital costs because of the great variability across hospitals in defining and allocating these costs. Because we collected data in 2003 and 2004, we inflation adjusted 2003 data by using the Professional Services Index of the CPI-U Medical Care Indices (Jones, 2008). We also adjusted for geographic variability in wages by using the Centers for Medicare and Medicaid Services wage index. Thus, our final cost per patient day measure is both wage adjusted and inflation adjusted, and was entered into the model as the natural log of these costs.

Hospital Characteristics—*Hospital size* was measured as the number of open and operating beds. *Teaching status* was calculated as the ratio of medical and dental residents to the number of open beds. The *case mix index* is a measure of resource intensity. A case mix index greater than 1.0 indicates that Medicare patients in the hospital require more than the “average” amount of resources, while a case mix index less than 1.0 indicates less resource intensity. *Magnet status* was measured using a single item that asked if the hospital was currently certified as a Magnet facility. Facilities that have achieved Magnet status have successfully undergone a rigorous certification process sponsored by the American Nurses’ Credentialing Center for Excellence in Nursing.

Nursing Unit Characteristics—*Unit size* was measured as the number of beds on the unit. *Availability of support services* was measured using a checklist in which nurses rated 21 support services as not available, inconsistently available, or consistently available, with higher scores indicative of greater availability (Mark, 1992; Mark et al., 2003, 2007). Examples included the availability of venipuncture/blood specimen collection, housekeeping services, computerized order entry, and discharge planning services. *Workload* was measured as the average number of patients cared for by each RN on the nursing unit. To calculate workload, we divided the average number of nursing hours per patient day over a six month period of time by 24 hours. For example, if the average number of hours of care per patient day was 12, this equates to 2 patients per nurse (i.e., $12/24 = 0.5$ nurse hours of care per patient hour and, by taking the inverse, we derive 2.0 patients per nurse). *Educational level* was measured as the proportion of RNs on the unit that had a minimum of a bachelors’ degree. *Tenure on the unit* was measured as the average number of months RNs had worked on the unit.

Nurse staffing was measured with several variables. These included the proportion of RNs relative to total nursing staff, the proportion of licensed practical nurses, and the proportion of unlicensed personnel. Because RN and LPN staffing are often dependent on each other, we also included the interaction of RN and LPN staffing. These nurse staffing variables are included because they are likely associated with unit costs, depending on the particular staffing decision chosen. For example, on average, because RNs command higher wages than other nursing staff, a greater proportion of RN staff may be associated with higher nursing unit costs. However, because RNs perform a broader array of key organizational functions than LPNs or unlicensed personnel, a higher proportion of RN staff may actually be associated with lower overall unit costs.

Patient Characteristics—*Gender* was represented as the proportion of females on the unit, and *age* was operationalized as the average age of patients on the unit. *Education* was measured as the proportion of patients on the unit with more than a high school diploma. *Health status* was measured as the response to a single 5-point Likert-type item in which patients evaluated their overall health status as ranging from very poor to very good, a method validated in a recent meta-analysis (DeSalvo, Bloser, Reynolds et al., 2005).

Data Sources

There were five sources of data for the study. The first source was the AHA *Annual Survey of Hospitals*, which provided information on hospital size and teaching status. The second source of data was surveys of RNs who had been employed on their units for a minimum of 3 months, and who were currently working a minimum of 20 hours per week. RNs provided data on two different occasions. Data about tenure on the unit, availability of support services and educational level were collected during the first data collection period from 3747 RNs (response rate 78%); data on working conditions were collected three months later from 2878 RNs (response rate 61%).

The third source of data was on-site study coordinators, who were selected by each hospital to assist with ORNA-II data collection. All study coordinators participated in a 1½ day training program conducted by the ORNA-II research team, which provided detailed information about the study purpose and procedures for data collection. Study coordinators provided data on Magnet status, workload, unit size, nurse staffing and costs. The fourth source of data was a random sample of 10 patients on each nursing unit (N = 2100, response rate 98%). Inclusion criteria were that patients had to be at least 18 years of age or older, hospitalized for at least 48 hours, able to speak and read English, and not scheduled for immediate discharge. Patients provided data on age, gender, education and health status. A final source of data was the Centers for Medicare and Medicaid Services wage index files.

Analysis

We used Mplus (Muthen and Muthen, 1998 – 2006) to analyze the data and regressed costs on working conditions, while controlling for hospital, unit, and patient characteristics. We used the “complex” modeling option because it provides correct standard errors for nested data (nursing units nested in hospitals).

Results

Table 2 provides descriptive results for the variables in the cost model, and Table 3 presents the unstandardized regression coefficients for all variables included in the model.

Our primary question was whether working conditions (defined as autonomy, participation in decision-making and relational coordination) were associated with nursing unit costs. The coefficient of -0.003 for working conditions was not significant, thus, we conclude that, controlling for hospital, nursing unit, and patient variables, working conditions for nurses were not associated with increased nursing costs.

The only hospital characteristic significantly associated with nursing unit costs was teaching status, with higher costs associated with nursing units in hospitals that had greater numbers of medical and dental residents per bed. Hospital size, the hospital's case mix index and achievement of Magnet status were not significantly associated with costs.

With regard to nursing unit characteristics, workload and tenure on the unit were not significantly associated with costs. However, larger units (measured by the number of beds) had lower nursing salary costs per patient day. Units employing a higher proportion of baccalaureate-prepared RNs had significantly higher costs. As would be expected, higher proportions of RNs and LPNs were also associated with increased costs. In addition, the interaction of RN staffing and LPN staffing was also significantly and negatively related to costs. When the interaction term is solved mathematically for the average hospital in our sample (with RNs comprising 59% of the total nursing staff and LPNs comprising 9.8%), we find that an increase in RN staffing of 1%, holding LPN staffing constant, results in a reduction in total salary costs per patient day of 0.03%, a small, but statistically significant effect. Although we did include a measure of the proportion of unlicensed personnel, this term dropped out of the analysis because it was fully determined when the proportion of RN staffing and proportion of LPN staffing variables were in the model.

Finally, although the signs on the coefficients for patient age, education level and health status were negative, none was significantly associated with nursing unit costs.

Discussion

Based on our analysis of data collected from RNs, patients, and secondary sources in 210 general medical surgical units across the U.S., we conclude that positive working conditions for nurses – characterized by autonomy, participation in decision-making, and relational coordination – do not significantly increase total salary costs on nursing units.

Our findings also revealed other hospital and nursing unit characteristics associated with nursing costs. Contributors to increased nursing unit costs included the extent to which the hospital was involved in teaching, a finding consistent with prior research on teaching hospitals which has found that a portion of teaching hospitals' higher costs are attributable to higher wages (Newhouse, 2003). This was the case in our sample: hospitals that were above the mean in the ratio of medical and dental residents to the number of hospital beds had significantly higher wages for RNs (but not for LPNs) than hospitals that fell below the mean (analysis not shown).

Another contributor to higher nursing unit costs was employing a greater proportion of RN staff having attained bachelor's degrees. Although some studies have found no significant economic returns to RNs for increased education (e.g., Schumacher, 1997), others have demonstrated both social returns to a bachelor's degree in terms of higher job satisfaction and career retention (Rambur et al., 2005), and economic returns in terms of a 3.2% wage differential paid to RNs with baccalaureate degrees (Jones and Gates, 2004). Our findings suggest that hospitals may be paying a premium to those RNs with a bachelor's degree because of their added value to the unit.

Finally, units that employed higher proportions of RNs and LPNs compared with unlicensed staff had increased nursing unit costs, which is not surprising given that their wages are generally higher than unlicensed nursing staff on the unit. Interestingly, however, the costs associated with an increase in LPN staffing (3.1%) were substantially larger than the costs associated with an increase in RN staffing (0.7%). This finding, while counterintuitive, is consistent with Spetz et al's finding (2006) in which increased LPN wages was associated with increased hospital demand. The explanation offered was that some LPNs may have advanced skills, which, because they are highly valued, are then rewarded with higher wages. In addition, if the increase in LPNs staffing is among those with substantial longevity, their wages may be higher than those of newly hired RNs.

The single contributor to lower salary costs per patient day was the number of beds on the unit, with larger units having lower costs than smaller units. When we compared costs on units that had more than the average of 34 beds to the costs on units that had fewer than the average number of beds, we found significant differences in their costs (analysis not shown). Larger units expended \$234 per patient day, whereas smaller units expended \$271 per patient day. This finding suggests that larger nursing units may be able to exploit certain economies of scale in caring for larger numbers of patients, perhaps because larger units have more nursing staff and enjoy additional slack and flexibility than smaller units, and are better able than smaller units to manage empty beds and variability in patient demand.

Because working conditions have been consistently linked with nursing satisfaction and retention (Page, 2004) knowing that "good" working conditions do not increase nursing unit costs may encourage hospital and nurse executives to support management efforts to improve autonomy, participation in decision-making and relational coordination. These approaches may go a long way to improve nurses' perceptions of their work conditions, but cost the organization very little beyond engaging and incentivizing those who manage nursing units to involve nursing staff in decision-making. While our study did not examine specific management strategies to improve autonomy, participation in decision-making, or

relational coordination, it may be useful to mention several approaches that have been reported in the literature. Additional research would be needed to fully evaluate their cost effectiveness in improving working conditions. Mrayyan (2004), for example, found that nurse managers were able to promote staff nurses' autonomy by encouraging them to communicate openly with all members of the health care team, supporting them in conflict resolution with physicians, and encouraging leadership. With regard to increasing staff nurse involvement in decision-making, strategies that seek nurses' input on discussions about the unit's strategic goals, solicit their feedback and opinions about proposed hospital and unit-level changes, particularly those that arise from cost pressures, and formal (or informal) mentoring programs may be useful.

Gittell (2004) suggests several strategies to increase relational coordination, another key dimension of good working conditions. These include routines, which prespecify the tasks and procedures to be performed and the order in which they should be carried out; boundary spanners, who are individuals whose job it is to integrate others' work; and team meetings, particularly under conditions of uncertainty, which are likely to characterize patient care in today's complex acute care hospital. Interestingly, there is notable overlap among some of the strategies identified to promote autonomy, participation in decision-making, and relational coordination, suggesting that their implementation may have synergistic and powerful effects on improving working conditions for nurses.

Conclusion

Although our study does have limitations – the restricted definition of nursing unit costs, potential measurement error across nursing units in cost reporting, and the cross sectional nature of the study -- that preclude our ability to make causal statements, the findings provide initial evidence about the relationship between positive working conditions and nursing unit costs that can may motivate further research. The convergence of a serious nursing shortage, continuing and escalating concerns with hospital costs, and a disenchanted RN labor force has stimulated hospitals' interest in deploying cost-effective ways to retain RNs as well as developing policies that will foster the recruitment of RNs in sufficient numbers and with sufficient expertise to provide safe, high quality care to patients. Our findings suggest that efforts to improve working conditions for nurses, by developing organizational policies that support autonomy, participation in decision-making and relational coordination may be an economically viable means to accomplish such an objective.

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Figure 1.
Model Inputs for Cost Analysis

Table 1

Variable Definitions and Sources of Data

Variable	Definition	Source of Data
Working conditions	Extent to which nurses engage in autonomous professional practice; participate in decision-making; and have positive relationships with other disciplines	RN surveys
Hospital characteristics		
Hospital size	Number of open and operating beds	AHA survey
Teaching status	Ratio of medical and dental residents to number of open beds	AHA survey
Case mix index	Average DRG weight for the hospital's Medicare volume	Study coordinator
Magnet status	Whether hospital is ANCC accredited	Study coordinator
Unit characteristics		
Size	Number of open, staffed beds on the unit	Study coordinator
Availability of support services	Extent to which support services were available to RNs on the unit	RN surveys
Nursing workload	Number of patients cared for by each RN	Study coordinator
Educational level	Proportion of RNs on the unit with minimum of bachelors degree	RN surveys
Tenure on the unit	Average number of months RNs worked on unit	RN surveys
Nurse staffing	Proportion of staff that are RN, LPN, aide	Study coordinator
Patient characteristics		
Gender	Proportion female on the unit	Patient surveys
Age	Average age of patients on the unit	Patient surveys
Education	Proportion of patients on the unit with more than a high school diploma	Patient surveys
Health status	Average patient self-rated health status	Patient surveys
Costs	<u>Total salary expenditures for RNs per patient day wage and inflation-adjusted</u>	<u>Study coordinator</u>

Table 2

Descriptive Statistics for Study Variables (N = 210)

	Minimum	Maximum	Mean	Std. Deviation
<u>Working Conditions</u>	-8.15	6.76	.11	2.33
<u>Hospital Characteristics</u>				
Hospital size	75.00	1242.00	345.06	190.54
Teaching status	.00	1.23	.13	.25
Case mix index	.96	2.08	1.42	.25
Magnet status	.00	1.00	.13	.34
<u>Nursing Unit Characteristics</u>				
Size	13.00	80.00	33.99	11.34
Availability of support services	23.00	39.17	32.52	2.52
Nursing workload	2.60	12.00	5.18	1.49
Educational level	.00	.90	.35	.18
Tenure on the unit	9.00	200.00	74.57	32.91
RN proportion	23.26	92.75	59.03	12.42
LPN proportion	.00	42.52	9.80	9.76
UAP proportion	.00	68.44	31.15	10.91
<u>Patient Characteristics</u>				
Gender (percent female)	.00	1.00	.55	.17
Age	36.71	78.25	57.10	7.56
Education level	.00	1.00	.49	.20
Health status	2.00	5.00	3.44	.43
<u>Costs</u>				
Nursing salary costs per patient day (\$)	50.88	1276.19	253.83	127.618

Table 3

Unstandardized Regression Coefficients for Nursing Costs (natural log) (N=210)

	Estimate	S.E.	Est./S.E.	Two-Tailed P-Value
<u>Working Conditions</u>				
	-0.003	0.013	-0.262	0.793
<u>Hospital Variables</u>				
Hospital size	0.000	0.000	0.063	0.950
Teaching status	0.341	0.152	2.251	0.024
Case mix index	0.092	0.115	0.798	0.425
Magnet status	-0.110	0.064	-1.714	0.086
<u>Nursing Unit Variables</u>				
Size	-0.005	0.002	-3.127	0.002
Support services	0.015	0.011	1.392	0.164
Workload	-0.030	0.019	-1.568	0.117
Educational level	0.305	0.161	1.894	0.058
Tenure on the unit	0.000	0.001	0.419	0.675
RN proportion	0.007	0.003	2.118	0.034
LPN proportion	0.032	0.009	3.726	0.000
RN $\times$ LPN				
Interaction	-0.001	0.000	-4.328	0.000
<u>Patient Variables</u>				
Gender (% female)	0.050	0.111	0.453	0.651
Age	-0.002	0.004	-0.361	0.718
Education level	-0.067	0.140	-0.481	0.630
Health status	-0.038	0.056	-0.682	0.495
<u>Intercept</u>	4.838	0.591	8.186	0.000
<u>R²</u>	0.273	0.058	4.673	0.000