Christine T. Kovner
Carol S. Brewer

William Greene
Susan Fairchild

Understanding New Registered Nurses' Intent to Stay At Their Jobs

Executive Summary

- Nursing turnover is costly for health care organizations.
- Newly licensed registered nurses work behavior is a complex process, influenced by their attitudes toward their work, personal characteristics, job opportunities, and workplace attributes.
- Several characteristics are significant in predicting satisfaction (ethnicity, gender) and organizational commitment (patient load, mandatory overtime, shift, and unit type) and intent to stay (income, age) over and above work attitudes.
- Among the most important implications are how the findings can inform management and policy.
- Findings from this study provide information that may be useful for those organizations that want to decrease their turnover rates.

Newly licensed registered nurses (NLRNs) are critical members of the health care and hospital workforce. Most hospitals hired at least one new graduate in 2000 (Group, 2002). The National League for Nursing (2006) estimates that there were about 84,878 new graduates in 2005, most of whom will pass the licensure examination to become NLRNs. It is thought that many of these new RNs leave hospital positions within 1 year of starting work (Squires, 2002), which is sooner than RNs with more experience. The number of people choosing nursing in their late 20s and 30s has increased in the last several years, moderating the widespread shortage of nurses that was predicted, but the shortage still will be sizable by 2020 (Auerbach, Buerhaus, & Staiger, 2007; U.S. Department of Health and Human Services, 2002).

Nursing turnover is costly for health care organizations. When an employee leaves, organizations incur hiring, orientation, and decreased productivity costs as well as temporary replacement costs. Estimates of these substantial costs are 1.2 to 1.3 times the 1-year salary of a registered nurse (RN) (Jones, 2004; Jones, 2005) to replace a single RN, or up to 5% of a hospital's budget for yearly turnover costs (Waldman, Kelly, Arora, & Smith, 2004). These costs often are paid by the government as a major payer of health care costs in the United States.

While employee turnover is costly, it may also benefit employers and employees. A new employee brings experience and education to employers that may benefit the employer. When RNs switch jobs they often increase their salaries. Job switching may also improve an employee's work-

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CHRISTINE T. KOVNER, PhD, RN, FAAN, is a Professor, College of Nursing, and Faculty Partner, NYU Langone Medical Center, New York University, New York, NY.

CAROL S. BREWER, PhD, RN, is a Professor, University at Buffalo, School of Nursing, Buffalo, NY.

WILLIAM GREENE, PhD, is a Toyota Motor Company Term Professor, Leonard N. Stern School of Business, New York University, New York, NY.

SUSAN FAIRCHILD, MPH, is Project Director, College of Nursing, New York University, New York, NY.

ing conditions, commute time, benefits, or intangibles of value to the employee. However, we could not locate any studies that examine the net societal costs and benefits of RN turnover.

Literature Review

There is strong support (Alexander, Lichtenstein, Oh, & Ullman, 1998; Hayes et al., 2006; Tett & Meyer, 1993) for the relationship between intent to stay in an organization and actual turnover. Understanding factors associated with NLRNs' intent to stay will provide employers and the government with strategies to intervene prior to turnover. The purpose of this study is to identify factors associated with NLRNs' intent to stay.

There is substantial literature on organizational turnover in a variety of occupations and some literature on RN turnover specifically. There are several major literature reviews (Hayes et al., 2006; Irvine & Evans, 1995; Lu, While, & Barriball, 2005; Tai, Bame, & Robinson, 1998) and meta analyses (Griffeth, Hom, & Gaertner, 2000; Hom & Griffeth, 1995) of RN turnover.

In studies that examine both intent and turnover, intent has been a good predictor of actual turnover (Alexander et al., 1998; Hayes et al., 2006; Irvine & Evans, 1995; Lake, 1998; Shader, Broome, Broome, West, & Nash, 2001; Taunton, Boyle, Woods, Hansen, & Bott, 1997; Tett & Meyer, 1993). Both "intent to leave" and the converse "intent to stay" are terms used in the literature. Typically the scales include items about leaving and staying. For consistency and ease of discussing the results, we use the term "intent to stay."

Search is a type of withdrawal cognition that characterizes the process of leaving a job and contributes to intent to stay. Search is defined as the extent to which an employee is looking for another job. Labor economists define these people as "working or looking for work" (Ehrenberg & Smith, 2006). Search also partially captures Hom and Griffeth's (1995) concept of thoughts of quitting. *Preparatory* search is behavior such as reading ads and *active* search is behavior such as calling employers (Griffeth et al., 2000). Search has a direct effect on turnover in some studies (Blau, 1993; Blau, 1994; Holtom & O'Neill, 2004; Hom & Griffeth, 1991; Price, 2001), but is not predictive of turnover in a large meta-analysis (Griffeth et al., 2000). It is possible that measurement variations may be the cause of these inconsistent results.

Price's (2001) theory on turnover posits that work attitudes (job involvement, autonomy, distributive justice, job stress, promotional chances, routinization, and social support [supervisor and peers], affectivity [positive and negative], job opportunities outside the organization, and pay [other compensation, benefits] predict job satisfaction. He contends that the work attitudes distributive justice, promotional chances, and supervisor support predict organizational commitment. Satisfaction and organizational commitment in turn predict search behavior, which predicts intent to stay at the job. He then posits that intent to stay, job opportunities, family responsibilities, general education, and search predict actual turnover. Consistent with Price, we define intent to stay as the respondents' attitude toward staying with their current employer.

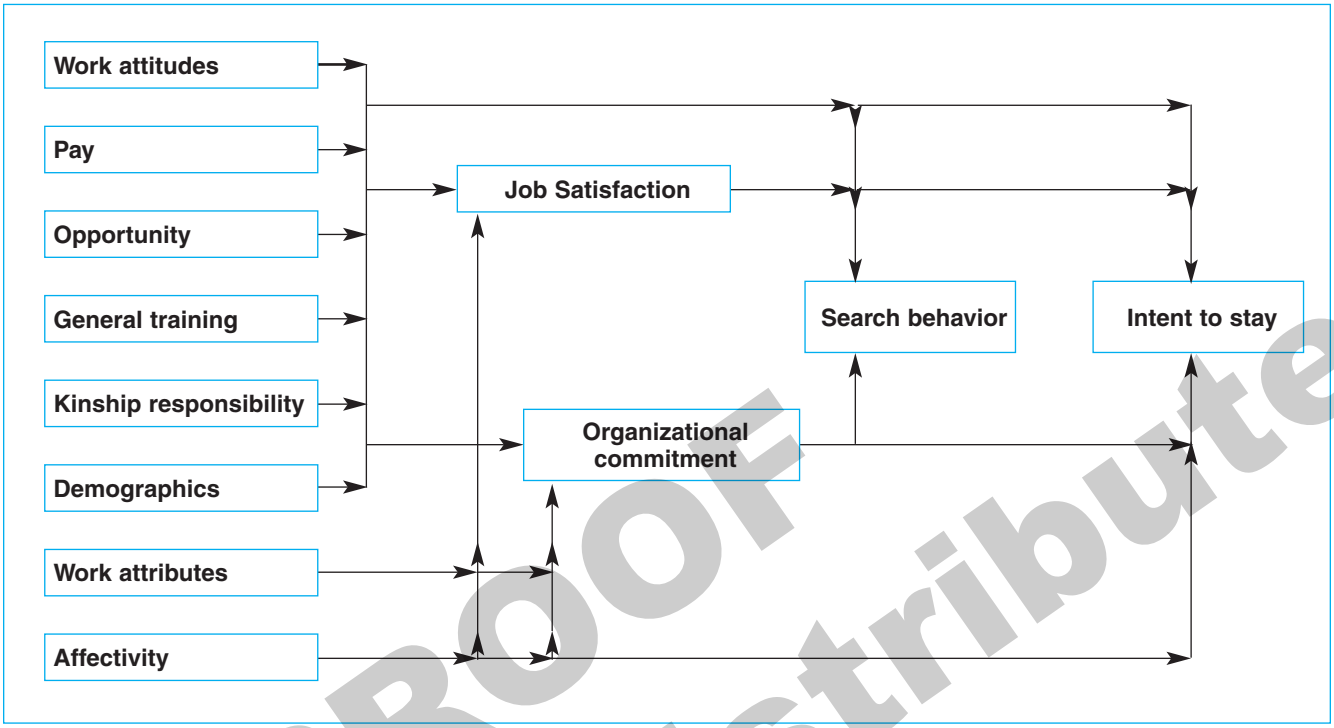
There is substantial literature that shows a positive relationship between job satisfaction and intent to stay (Baruch & Winkelmann-Gleed, 2002; Borda & Norman, 1997; Dockery, 2004; Francis-Felsen et al., 1996; Gurney, Mueller, & Price, 1997; Ingersoll, Olsan, Drew-Cates, DeVinney, & Davies, 2002; Irvine & Evans, 1995; Kuokkanen, Leino-Kilpi, & Katajisto, 2003; Lake, 1998; Larrabee et al., 2003; Lu et al., 2005; Lu, Lin, Wu, Hsieh, & Chang, 2002; Lum, Kervin, Clark, Reid, & Sirola, 1998; Prevosto, 2001; Rambur, Palumbo, McIntosh, & Mongeon, 2003; Shader et al., 2001; Shields & Ward, 2001; Tzeng, 2002). Ingersoll et al. (2002) found dissatisfied nurses had a 65% lower probability of indicating intent to stay when surveyed than did satisfied nurses.

There is also literature that reports a positive relationship between organizational commitment and intent to stay (Baruch & Winkelmann-Gleed, 2002; Gurney et al., 1997; Ingersoll et al., 2002; Lu et al., 2002; Lum et al., 1998; Lynn & Redman, 2005; Roberts, Jones, & Lynn, 2004). Additionally, task orientation, satisfaction, organizational identification (Karsh, Booske, & Sainfort, 2005), work group cohesion, collaboration, organizational commitment, and heavy workload (Strachota, Normandin, O'Brien, Clary, & Krukow, 2003; Tai et al., 1998) are related to intent to stay.

The empirical relationship between job satisfaction and intent to stay is better established than the relationship of job satisfaction to search behavior. In a mediation analysis, Van Hooft, Born, Taris, Flier, and Blonk (2004) found job satisfaction and organizational commitment to be negatively associated with job search behavior. Kim, Price, Mueller, and Watson (1996) examined determinants of career intent among physicians. Commitment had the largest effect on intent to stay and was partially mediated through search. The impact of satisfaction on intent to stay was primarily indirect through search and commitment.

The relationships of autonomy and nurse-physician collaboration were positive, and job stress was negative to satisfaction in a meta analysis of recent literature (Zangaro & Soeken, 2007). Heavy workload decreases job satisfaction (Aiken et al., 2002). Gaertner (1999) showed a direct positive relationship of peer support and autonomy, and a negative relationship of workload, role conflict,

Figure 1.
Brewer-Kovner Revision of Price Model



Adapted from Price (2001, p. 602).

role ambiguity, and routinization to satisfaction.

Distributive justice, promotional chances, and supervisory support were positively related to organizational commitment over and above their relationship to satisfaction in a meta analysis of nine studies on a variety of samples directed by Price and Mueller (as cited in Gaertner, 1999). Pay was not related to organizational commitment. Other studies have shown additional variables to be related to organizational commitment such as impact of culture, trust, and satisfaction (Gregory, Way, LeFort, Barrett, & Parfrey, 2007).

Demographic characteristics such as age (Shields & Ward, 2001) and experience (Chan & Morrison, 2000; Larrabee et al., 2003) are positively related to intent to stay. Nurses with higher levels of education were less likely to remain employed with their current employers (Shields & Ward, 2001).

The Brewer and Kovner revision of Price's model is shown in Figure 1 and tested in the analyses reported below. Based on empirical literature, we modified Price's model to include variables that are usually included in economic models of workforce participation such as measures of market level factors, demographic characteristics including other income, benefits, and spousal wage, and part-time/full-time work status (Brewer et al., 2006; Chiha & Link, 2003). We also included work-family conflict (work interfering with family) and family-work conflict (family interfering with work), which have been noted in the organizational literature as predictive of job satisfaction and intent to stay (Grzywacz, Frone, Brewer, & Kovner, 2006). Based on literature in the nursing field we also included other work variables such as amount of overtime and time of shift (Trinkoff, Geiger-Brown, Brady, Lipscomb, & Muntaner, 2006). Price (2001) includes general training. NLRNs have all completed at least a basic nursing educational program.

Measures

We selected scales used in previous research based on Price's model, were proposed by Price, or were otherwise well established with good validity and reliability. These scales are listed in Table 1, which includes a sample item, Cronbach alphas from the current sample, means, standard deviations, response options, and possible range. The number of items on each scale varied from 3 to 8. To decrease response fatigue, the number of items were decreased in some of the scales from their original number (see Table 1).

In all there were 22 multi-item measures. Five measures assessed work attitudes and behaviors (job

Table 1.
Continuous Dependent, Intervening and Work Attitude, Affectivity, and Opportunity Variables

Variable	Definition and Example	n	Alpha	Mean (SD)	Possible Range
Dependent and Intervening Variables					
Intent to stay (Price, 2001)	Degree of positive affect that an individual has toward the idea of voluntarily leaving the employer or an organization (e.g., "I plan to stay with my employer as long as possible").	1,926	0.88	13.37 (3.74)	1 = Strongly disagree to 5 = Strongly agree Range: 4-20
Search behavior (Price, 2001)	Degree to which employees are looking for other jobs.	1,926	0.76	11.31 (1.69)	1 = Strongly disagree to 5 = Strongly agree Range: 4-20
Job satisfaction (adapted from Quinn & Staines, 1979)	Employee's general affective reaction to the job without reference to any specific job facet (e.g. "How satisfied would you say you are with the job you now have?").	1,930	0.86	25.37 (7.64)	Range: 5-35
Organizational commitment (Price, 2001)	Loyalty of employees to their employers (e.g., "I think that my present employer is a great organization to work for").	1,928	0.87	22.77 (4.59)	1 = Strongly disagree to 5 = Strongly agree Range: 6-30
Work-Related Attitudes					
Autonomy (Gurney et al., 1997)	Degree to which employees control their job performance [1] (e.g., "To what extent are you able to act independently of your immediate supervisor in performing your job?").	1,926	0.94	3.73 (0.72)	1 = None at all to 5 = A great deal Range: 1-5
Variety (Gurney et al., 1997)	Degree to which job performance is repetitive (e.g., "How much variety is there in your job?"). [2]	1,927	0.64	3.35 (0.66)	1 = None at all to 5 = A great deal Range: 1-5
Distributive justice (Gurney et al., 1997)	Degree to which an employee's rewards are related to his/her performance inputs into the organization (e.g., "To what extent are you fairly rewarded considering the responsibilities that you have?").	1,918	0.93	2.81 (0.87)	1 = Not at all to 5 = To a very great extent Range: 1-5
Procedural justice (Fields, 2002)	Degree to which rights are applied universally to all employees (e.g., "People involved in implementing decisions have a say in making the decisions").	1,923	0.80	3.29 (0.74)	1 = Strongly disagree to 5 = Strongly agree Range: 1-5
Work-family conflict (Frone, Yardley, & Markel, 1997)	Degree to which an employee's job interferers with his/her family life (e.g., "How often does [did] your job interfere with your responsibilities at home, such as yard work, cooking, cleaning, repairs, shopping, paying the bills, or child care?").	1,924	0.91	3.28 (1.23)	1 = Never to 6 = Five or more days per week Range: 1-6
Family-work conflict (Frone et al., 1997)	Degree to which an employee's family life interferers with his/her job (e.g., "How often does [did] your home-life interfere with your responsibilities at work, such as getting to work on time, accomplishing daily tasks, or working overtime?").	1,923	0.85	1.64 (0.79)	1 = Never to 5 = Five or more days per week Range: 1-6

Table 1. (continued)
Continuous Dependent, Intervening and Work Attitude, Affectivity, and Opportunity Variables

Variable	Definition and Example	n	Alpha	Mean (SD)	Possible Range
Work-Related Attitudes (continued)					
Promotional opportunities (Gurney et al., 1997)	Degree to which career structures within an organization are available to its employees (e.g., "Promotions are regular"). [3]	1,921	0.77	3.38 (0.77)	1 = Strongly disagree to 5 = Strongly agree Range: 1-5
Collegial RN-MD relations (Lake, 2002)	Relationship between nurses and physicians (e.g., "Physicians and nurses have good working relationships").	1,914	0.88	2.81 (0.58)	1 = Strongly disagree to 4 = Strongly agree Range: 1-4
Work motivation (Gurney, 1990)	Degree to which work is central to an employee's life (e.g., The most important things that happen in life involve work"). [4]	1,928	0.79	2.09 (0.72)	1 = Strongly disagree to 5 = Strongly agree Range: 1-5
Work-Related Attitudes: Social Support					
Supervisory support (Gurney et al., 1997)	Degree to which supervisor supports and encourages employee (e.g.,"'Pays attention to what I am saying"). [5]	1,923	0.94	3.53 (0.95)	1 = Not at all to 5 = To a very great extent Range: 1-5
Mentor support (Gurney et al., 1997)	Degree of adequacy of access to an appropriate experienced professional to sponsorship, protectorship, and professional benefactorship (e.g., "How often does someone at your workplace show you how to work successfully within the organization?"). [6]	1,921	0.86	3.02 (0.81)	1 = Never to 5 = Very Often Range: 1-5
Work group cohesion (Gurney et al., 1997)	Degree to which employees have friends in their immediate work environment (e.g., "Are individuals in your work group friendly?"). [7]	1,926	0.89	4.02 (0.78)	1 = Not at all to 5 = To a very great extent Range: 1-5
Job Stress					
Quantitative workload (Spector & Jex, 1998)	Amount of performance required in a job (e.g., "Does your job require you to work very fast?"). [8]	1,924	0.88	4.11 (1.01)	1 = Never to 6 = 5 or more days per week Range: 1-6
Organizational constraints (Spector & Jex, 1998)	Degree to which situations or things interfere with employees' job performance (e.g., "How often do you find it difficult or impossible to do your job because of organizational rules and procedures?"). [9]	1,922	0.87	2.48 (0.86)	1 = Never to 6 = 5 or more days per week Range: 1-6
Affectivity					
Positive affectivity (Watson & Tellegen, 1985)	Degree of the individual's affirmative mood (e.g., "I live a very interesting life").	1,928	0.86	3.54 (0.68)	1 = Strongly disagree to 5 = Strongly agree Range: 1-5
Negative affectivity (Watson & Tellegen, 1985)	Degree of the individual's negative mood (e.g., "Often I get irritated at minor annoyances").	1,928	0.85	2.67 (0.86)	1 = Strongly disagree to 5 = Strongly agree Range: 1-5

Table 1. (continued)
Continuous Dependent, Intervening and Work Attitude, Affectivity, and Opportunity Variables

Variable	Definition and Example	n	Alpha	Mean (SD)	Possible Range
Opportunity					
Local job opportunity (Price, 2001)	Likelihood of obtaining jobs in local area as good, worse, or better than current job [10] (e.g., "How easy or difficult would it be for you to find a job with another employer in the local job market in which you work or live that is as good as the one you have now?"). [11]	1,911	0.92	3.41 (1.21)	1 = Very difficult to 6 = Very easy Range: 1-6
Non-local job opportunity (Price, 2001)	Likelihood of obtaining jobs in non-local area as good, worse, or better than current job (e.g., "How easy or difficult would it be for you to find a job with another employer outside the local job market in which you work or live that is as good as the one you have now?").	1,893	0.95	3.60 (1.27)	1 = Very difficult to 6 = Very easy Range: 1-6

[1] Scale item "How much are you left on your own to do your work?" dropped.
[2] Scale item "How similar are the tasks you perform in a typical working day?" dropped.
[3] Scale item "There is an opportunity for advancement" dropped.
[4] Scale item "Life is worth living only when people get absorbed in work" dropped.
[5] Scale item "Easy to approach" dropped.
[6] Scale item "Listens to your ideas" dropped.
[7] Scale item "Do you trust individuals in your work group?" dropped.
[8] Scale item "How often is there a great deal to be done?" Response item edited for logical consistency.
[9] Scale items "poor equipment or supplies," "other employees," and "inadequate training" dropped. Response item edited for logical consistency.
[10] Altered response scale from "not easy at all" to "very difficult," "not very easy" to "quite difficult" and added "somewhat difficult."
[11] Altered response scale from "not easy at all" to "very difficult," "not very easy" to "quite difficult" and added "somewhat difficult."

satisfaction, organizational commitment, work motivation, intentions to stay, and job search behaviors). Fifteen measures assessed attitudes about work-related conditions (job variety, autonomy, quantitative workload, organizational constraints, work-to-family conflict, family-to-work conflict, distributive justice, procedural justice, promotional opportunities, local job opportunities, non-local job opportunities, work group cohesion, collegial MD-RN relations, supervisory support, and mentor support). Finally, two measures assessed employee affective dispositions (negative affectivity, positive affectivity). Scales had adequate to excellent reliability as the Cronbach alpha scores were 0.80 or greater (except for promotional opportunities, autonomy, and variety, which had alphas of 0.70 or higher). Intent to stay was measured as the total score on a four-item Likert-like scale. Values range from 4 to 20.

Methods

For the most part, researchers have treated satisfaction, organizational commitment, search behavior, and intent to stay as continuous variables and used linear regression to study relationships among these variables (Gaertner, 1999; Gregory et al., 2007; Price & Kim, 1993; Way et al., 2007)

In our study, each of these outcome variables (satisfaction, organizational commitment, search behavior, and intent to stay) is a discrete ordered choice variable. Nurses are surveyed as to their preferences on different scales (e.g., on a scale from 0 to 20, how strong is your commitment to the organization?). The measure is thus ordered. However, the specific values are not quantitative measures of preferences. For example, a reported value of 10 is greater than a 9, but the unit difference between a 10 and 9 is not necessarily the same as between a 5 and a 4. An ordered probit model was used for these preference outcomes (Greene, 2008; McKelvey & Zavoina, 1975).

Data Collection

Data were obtained from a cross-sectional survey mailed to NLRNs (Kovner et al., 2007). We included those RNs who passed the National Council Licensure Examination (NCLEX), which is the examination required by all states for RN licensure, between September 2004 and August 2005 and had not worked in a foreign country as a RN prior to licensure. The sample was selected using a

two-stage sample of RNs nested in 51 metropolitan areas (MSA) and nine non-MSA rural areas in 34 states (AL, AR, AZ, CA, CO, CT, FL, GA, IL, IN, KY, LA, MA, MD, ME, MI, MN, MO, NC, NJ, NV, NY, OH, OK, OR, PA, SC, TN, TX, WV UT, VA, WA, WI), and the District of Columbia (DC). The sampling frame (lists of names and contact information) was obtained by combining data from each state and DC's Board of Nursing.

The sample design is identical to the one used for the Community Tracking Survey conducted by the Center for Studying Health System Change (2003). The 60 sites were chosen randomly with certain known probabilities. We used these same probabilities along with estimates of the number of NLRNs in each site and estimates of each site's eligibility rate (proportion of NLRNs) in allocating the sample. The goal was to make sampling probabilities equal across the different sites, minimizing the need to weight the data and helping to facilitate analysis.

A total 14,512 surveys were mailed; 4,402 respondents did not meet our criteria for NLRNs, and 6,005 did not return their surveys (classified as unknown eligibles). About half the states provided us with lists of RNs newly licensed in that state that included RNs who had been licensed in other states previously. One state provided us with a list of all RNs whether newly licensed or not. Our goal was to obtain responses only from those RNs who had recently graduated from an academic program and were newly licensed for the first time anywhere.

A further 105 returned their surveys but declined to participate, yielding a response rate of 58%. Length of time worked is a critical variable for all of our analyses. Of the remaining 4,000 RNs who completed the surveys, the length of time that 361 RNs had worked could not be determined and 223 were foreign-educated RNs who graduated in or prior to 2001 and who we assumed had worked as RNs in their home countries. In addition, 36 surveys were missing data on foreign education or date of graduation. These three categories of respondents were eliminated. This left a sample of 3,380. To eliminate possible systematic error that could arise from a heterogeneous sample, the sample was limited further. NLRNs who worked as staff nurses in intensive care units, step-down, or general units in hospital inpatient settings were selected to increase the homogeneity of the sample and decrease the variance from unspecified variables. This left an analytic sample of 1,933.

Response rates estimate the proportion of the eligible sample that actually completed a survey. Response rates were calculated using the American Association of Public Opinion Research (2004) standard response rate #3. Response rates across MSAs and rural areas varied from 37% in New York City to 65% in Seattle, WA. Data were collected using a 16-page mailed survey that was professionally printed in 8.5" x 11" booklet format. Multiple mailings were sent to non-responders following the Dillman Tailored Design method (Dillman, 2000). An alert letter, a survey including a $5 incentive, a reminder postcard, an additional survey, and finally a survey via U.S. Postal Service next-day mail were sent. Data were collected between mid-January and mid-April 2006.

Results

Respondents were primarily White non-Hispanic (80%), married (52%), and female (92%) with no children living at home (81.6%). Table 2 (continuous variables) and Table 3 (categorical variables) show the demographic characteristics, opportunity, work attributes, and pay of respondents. Sample characteristics are similar to those from a recent national survey of NLRNs. The National Council of State Boards of Nursing (NCSBN) conducted a national survey of 628 newly licensed RNs in the United States (Kenward & Zhong, 2006). White respondents were 77.9% of the NCSBN sample and 80% of our sample. Associate's degree graduates made up 59.3% of the NCSBN sample and 53.7% of ours. In the NCSBN study sample, 70.1% worked 12-hour shifts compared with 77% of ours. The percentage of respondents employed in rural areas in the NCSBN sample was 17.2%, in ours 14.8%. The NCSBN sample included NLRNs who worked in any setting. About 87.7% of the NCSBN sample worked in hospitals. The data reported here include only NLRNs that work in hospitals. The data reported here came from a larger data set in which 87.3% NLRNs worked in hospitals.

In terms of their work life, the NLRNs in our sample had a mean wage of $21.98 per hour (SD 6.65), a median of $21.37, and on average had 5.4 different benefits such as health insurance. Eighty-five percent worked full-time and their mean and median wages were $21.30 (SD $5.88) and $20.98 respectively (not shown).

Ordered choice models (e.g., probit and logit) are used for variables that describe an underlying continuous scale with a set of ordered but non-quantitative integers. For example, in a survey of strengths of preferences for a place or type of employment, respondents might be asked to rate their feelings as (1 = very low, 2 = low, 3 = indifferent, 4 = high, 5 = very high). The central feature of the data that the ordered choice model is designed to handle is that the values of the response variable (e.g., 1,2,3,4, and 5) are not amenable to ordinary regression methods because the "values" are only labels that indicate the ordering of the possible responses, not quantitative values. For example, in this setting, the unit difference between "low" and

Table 2.
Continuous Demographic, Opportunity, and Work Attribute Variables

Variable	n	Mean (SD)	Possible Range
Demographics			
Age in 2006	1,903	31.41 (8.34)	Range: 19-69
Spousal income	1,871	2.62 (3.38)	Range: 0-30
Yearly income from other sources	1,928	1.29 (7.12)	Range: -0.59-180
Opportunity			
2002-03 Percent of persons of all persons in HMOs	1,927	43.35 (12.48)	Range: 16.68-69.37
2004-05 Percent of physicians that say practice faces a very competitive market	1,927	19.56 (7.97)	Range: 2.07-40.34
2004-05 Mean percent of physicians reporting that nursing support is better than 3 years ago	1,927	26.30 (7.58)	Range: 7.35-49.41
Beds per 1,000 population	1,927	3.12 (1.25)	Range: 1.20-8.76
Unemployment rate	1,927	5.10 (0.91)	Range: 3.40-8.30
Work Attributes			
Months worked in current job up to January 2006	1,844	11.00 (11.13)	Range: 1-256
Hours of mandatory overtime	1,922	0.57 (2.44)	Range: 0-46
Hours of voluntary overtime	1,914	3.38 (4.59)	Range: 0-30
Number of times change in supervisor	1,925	0.41 (0.84)	Range: 0-12
Number of patients cared for on most recent shift	1,931	4.60 (2.26)	Range: 1-30
Work Attributes: Pay			
Total number of RN benefits	1,839	5.43 (0.87)	Range: 0-6
Importance of benefits	1,924	3.36 (0.84)	Range: 1-4
Imputed wages	1,927	21.98 (6.79)	Range: 2.16-88.14

"very low" need not represent the same difference in preference as the unit difference between "indifferent" and "low." In practical terms, the ordered choice model is used to assign probabilities to outcomes, not to produce regression-style prediction equations.

Tables 4 and 5 show the ordered probit model estimates for the model shown in Figure 1. For satisfaction, all work attitudes with the exception of distributive justice were significantly related to satisfaction consistent with the model. For demographic characteristics, being female increased the probability of being satisfied, while race/ethnicity of "other" or Asian decreased it. Work-family conflict, family-work conflict, and positive affectivity were not related to satisfaction. In terms of the local work environment, perceived local and non-local job opportunities, and the number of hospital beds per 1,000 population were negatively related to satisfaction. At the median, as job opportunities increase the probability of scoring higher on job satisfaction decreases. Several of the work setting characteristics that we added to the Price model were significant: those who worked more mandatory (required) overtime and those who had higher patient loads were less satisfied. At the same time, those working voluntary overtime were more satisfied as were those who reported a higher importance of benefits.

Similarly, work attitudes, with the exception of quantitative workload and work motivation, were related to organizational commitment. Work-family conflict, family-work conflict, and positive affectivity were not related to organizational commitment. In the local work environment, local and non-local job opportunities were negatively related to organizational commitment. In the workplace, those NLRNs working on general medical-surgical units and those working 8-hour shifts on any unit were more likely to be committed to the organization, as were those who worked full-time and those who rated the importance of benefits higher. Those who reported mandatory overtime and those who had higher patient loads were less likely to be committed to the organization. Those who had children at home reported less organizational commitment.

Income from other sources was negatively related to search behavior. More local job opportunities were positively related to search behavior. NLRNs with higher satisfaction and organizational commitment were more likely to intend to stay, while those who had searched for another job were less likely to intend to stay.

In addition, those NLRNs reporting more autonomy, promotional opportunities, and fewer local and non-local job opportunities were more likely to intend to stay, while those who perceived less supervisory support were more likely to intend to stay. Older NLRNs and those whose spouses' income was higher were more likely to stay and those with a baccalaureate degree were less likely to intend to stay.

Table 3.
Demographic Characteristics of Newly Licensed RNs (n=1,933; categorical variables)

Categorical Variables	Response Options	n	Valid %
Demographics			
Gender	Male	155	8.0
	Female	1,778	92.0
Ethnic background	White Non-Hispanic	1,522	80.0
	White Hispanic	35	1.8
	Black Non-Hispanic	133	7.0
	Black Hispanic	3	0.2
	Asian	104	5.5
	Other	106	5.6
Health status	Good/Very Good/Excellent	1,829	94.7
	Poor/Fair	102	5.3
Opportunity			
Geographical size	Small MSA	44	2.3
	Medium MSA	416	21.6
	Large MSA	1,181	61.3
	Rural non-MSA	286	14.8
Work Attributes			
Unit where spent most of working time	ICU	497	25.8
	Step-down	316	16.4
	General	1,115	57.8
Magnet hospital	No	1,260	69.9
	Yes	543	30.1
Defined by us (≥ 35 hrs/wk including outside of nursing)	Part time	282	14.6
	Full time	1,648	85.4
Type of shift	8-hour shifts	338	17.5
	10-hour shifts	13	0.7
	12-hour shifts	1,485	77.0
	Flexible schedule	66	3.4
	Other	27	1.4
Typical work schedule	Day	639	33.3
	Evening	167	8.7
	Night	824	42.9
	Rotating	291	15.1
Part of a union	No	1,323	69.4
	Yes	584	30.6
Kinship Responsibility			
Current marital status	Married (or domestic partnership)	1,005	52.0
	Widowed, divorced, or separated	169	8.7
	Never married	757	39.2
Children less than 6 years old	No children	1,572	81.3
	Child less than 6 years old	355	18.4
General Training			
First (basic) nursing degree leading to RN licensure	Diploma	63	3.3
	Associate	1,029	53.7
	Baccalaureate	820	42.8
	Master's or doctoral	4	0.2
Highest other degrees related to nursing	Diploma	23	9.6
	Associate	23	9.6
	Baccalaureate	28	11.7
	Master's or doctoral	7	2.9
	None	158	66.1

Discussion

NLRNs work behavior is a complex process, influenced by their attitudes toward their work, personal characteristics, job opportunities, and workplace attributes. Price proposed that work attitudes were related to satisfaction and organizational commitment, which were in turn related to search behavior, all of which with the addition of job opportunities were related to intent to stay. We expanded his model to include additional objective measures of some of the variables. Price and others argue that demographic characteristics are not related to turnover. They argue that a fully specified model (one that includes all of the variables related to turnover) will result in non-significant demographic and other attribute variables (Kim et al., 1996; Price, 2004). We have shown that several characteristics are significant in predicting satisfaction (ethnicity, gender) and organizational commitment (patient load, mandatory overtime, shift, and unit type) and intent to stay (income, age) over and above work attitudes. Some work attitudes have direct effects not shown in Price's model. For example, Price measures job opportunities using the employee's perception of job opportunities. In addition to that measure, we included local market characteristics that are likely to correlate with the availability of RN jobs such as beds per 1,000 population and the percent of persons in HMOs. These were significantly related to satisfaction only, while the RNs perceived local job opportunity was related to each of the dependent variables. It is likely that perception of job opportunity is really what impacts intent to leave. The influence of market factors was explained by Brewer et al. (2006), but how market factors influence RN behavior needs more research. Our objective measures of job opportunity may not have captured the actual job

market in an area. For example, we used the overall unemployment rate for a MSA or rural area, which may not be a good measure of unemployment in the hospital sector.

We also included work attributes that others report as related to satisfaction, commitment, and intent such as whether a hospital had Magnet® status (Schmalenberg & Kramer, 2008; Stordeur, D'Hoore, & the NEXTStudy Group, 2007). Magnet status is applied for by a hospital and awarded by the American Nurses' Credentialing Center, an affiliate of the American Nurses Association, indicating high-quality nursing (The Center for Nursing Advocacy, 2008). Magnet status, which has received substantial attention in the literature (Scott, Sochalski, & Aiken, 1999; Smith, 2006; Vadala, 2007), was not related to any of our dependent variables. We argue that it is not Magnet status per se, but rather common characteristics of Magnet hospitals such as autonomy and lower organizational constraints, which presumably also exist in many non-Magnet hospitals, that are related to satisfaction and organizational commitment. When one has a highly specified model as we do, those characteristics of Magnet hospitals that may lead to organizational commitment and satisfaction are actually measured in the model. We omitted organizational constraints from the model and found that Magnet status was related to organizational commitment; however, when we included organizational constraints back in the model, the relationship between Magnet status and organizational commitment disappeared. Future researchers should be cautious when choosing hospitals that do not have Magnet status as comparisons to Magnet hospitals, because the non-Magnet hospitals may be quite similar to the Magnet hospitals. We also included shift work (Pisarski et al., 2006; Ruggiero & Pezzino, 2006; Stone et al., 2006) and mentor support (Gurney et al., 1997) that were related to satisfaction, but were not included in Price's model.

Most researchers who study outcomes such as satisfaction, organizational commitment, and intent to stay assume that these variables are continuous, although they are clearly not. There is no evidence that the distance between 1 and 2 on a satisfaction scale and 2 and 3 on the same scale is even at the interval level. Therefore, the analytic method (in this case probit) must be appropriate for ordinal data. We did not assume that and instead used an analytic method — an ordered probit model — that has not been commonly used in turnover and does not assume that the variables are continuous. We also ran these models using linear regression (OLS) (results not shown). Findings showed that collegial RN-MD relations were not significantly related to satisfaction in the OLS analysis, but were in the ordered probit. This finding could have important organizational and policy implications. Organizations can have significant impact on opportunities for RNs and physicians to work together and in identifying acceptable norms of behavior and civility.

We have reported only the expanded models. However, we also estimate a version of Price's model. On the basis of the log likelihood function, we concluded that the expanded model provided a significant improvement.

Among the most important implications are how the findings can inform management and policy. As noted earlier, the implications of treating the dependent variables as linearly related to the independent variables are that any change in a predictor will impact the dependent variables equally without regard to the value of the dependent variable. Our work shows that this is not the case, at least among NLRNs.

Ordered probit estimates the probability of the occurrence of multiple events. The dependent variable in an ordered probit model takes J+1 possible values, 0,…, J. The marginal effects of the independent variables are the effects of changes in those variables on the probabilities of these events. There are in principle, J+1 full sets of effects. In fact, since the probabilities sum to one, the effects for a specific variable must sum to zero. By construction, then, when the partial effects of a variable on all the outcomes are considered, we will see them change sign — in fact exactly once. For a specific example, consider the satisfaction equation, in which there are 31 outcomes, and we consider the impact of changes in supervisory support. This variable enters the model with a positive coefficient (+0.130). This implies that in the set of 31 marginal effects of this variable on the probabilities of the outcomes, there will be a sequence of negative effects followed by a sequence of positive ones. Qualitatively, the implication of the positive coefficient in the model is that increases in supervisory support lead generally to increases in the probabilities of higher values of satisfaction and decreases in the probabilities of lower values of satisfaction (as one might expect).

Typically, not all of these particular effects would be of interest, especially so in a setting in which J is large (e.g., in our satisfaction equation). Consider a hospital setting in which managers are interested in increasing satisfaction (ultimately for the purpose of increasing intent to stay). For the typical (median) NLRN whose satisfaction score is 19, increasing supervisory support by one unit from its mean of 3.55 would increase the probability of scoring a 20 by 0.01, which one might argue is trivial. But, we might also consider the effect of the change on scoring "more than 19," which would include 20, 21, and so on. We would obtain this effect by

adding the partial effects for all the events above 19, which gives a value of 0.049 when there is a change of one unit in supervisory support. These probabilities vary by independent variable. The value above which the score will be impacted positively also varies by variable. We show in Tables 4 and 5 these probabilities for one value of each dependent variable. We choose that value, because it is where the greatest probability is.

By this computation, we can identify not only the magnitude of the probability for scores of interest, but also which of the independent variables could be changed with the greatest marginal benefit. This would provide hospital managers with information about where to direct their limited resources. In the data presented here, procedural justice, promotional opportunities, and mandatory overtime would have the highest marginal impact on increasing the score on organizational commitment to above 19 for a one unit change in their value. In terms of factors that managers can control related to satisfaction, variety, and workground cohesion would have the largest marginal effect. For search, local opportunities have the largest significant effect. Organizational commitment, promotional opportunities, and autonomy would have the highest marginal impact on decreasing intent to stay.

For categorical variables, a change from zero to one (having or experiencing the variable such as having children or having a union) would have a marginal impact on the probability of scoring above a particular satisfaction index, in similar fashion to the change in a quantitative measure such as supervisory support.

As shown in Table 4, the probability of a change in a value of organizational commitment increases at the median and decreases below the median. Thus, we estimate that increasing promotional opportunities by one unit (e.g., from three to four on a five-point scale) will increase the probability of someone scoring 20 or higher (possible values 6-30) on organizational commitment by 0.115 (or slightly more than 1%). Although not shown in the tables, the estimate of these changes varies by the estimated value of organizational commitment. Thus, the expected change for someone at the lower end of the scale is different from the expected change for someone at the higher end.

Although we did not study why these relationships occurred, perhaps when there are multiple job opportunities in an area, a nurse is less committed to the organization because he or she sees other options. The relationship between less supervisory support and higher probability of intending to stay is puzzling and requires further study.

Managers and government

Table 4.
Ordered Probit Model of Satisfaction and Organizational Commitment of Newly Licensed RNs (n=1,406)[12]

	Satisfaction					Organizational Commitment				
		Estimates		Partial Effects			Estimates		Partial Effects	
Variable Name	Mean	Coefficient	*P*(|Z|>z]	ME [13]	Median	Mean	Coefficient	*P*(|Z|>z]	ME [16]	Median
		1.201	0.174				-0.715	0.236		
Work Attitudes										
Variety	3.36	0.251	0.000	0.100	Y=27	3.36	0.149	0.002	0.059	Y=20
Autonomy	3.74	0.152	0.000	0.060	Y=27	3.74	0.137	0.001	0.055	Y=20
Supervisory support	3.55	0.130	0.001	0.052	Y=27	3.55	0.111	0.003	0.044	Y=20
Workgroup cohesion	4.05	0.302	0.000	0.121	Y=27	4.05	0.139	0.001	0.055	Y=20
Mentor support	3.04	0.150	0.002	0.060	Y=27	3.04	0.199	0.000	0.079	Y=20
Distributive justice	2.83	0.043	0.294	0.017	Y=27	2.83	0.138	0.001	0.055	Y=20
Promotional opportunities	3.41	0.179	0.000	0.071	Y=27	3.41	0.289	0.000	0.115	Y=20
Procedure justice	3.33	0.110	0.030	0.044	Y=27	3.33	0.264	0.000	0.105	Y=20
Quantitative workload	4.10	-0.183	0.000	-0.073	Y=27	4.10	-0.002	0.958	0.001	Y=20
Organizational constraints	2.46	-0.182	0.000	-0.073	Y=27	2.46	-0.233	0.000	0.093	Y=20
Collegial RN-MD relations	2.82	0.116	0.033	0.046	Y=27	2.82	0.198	0.000	0.079	Y=20
Work-family conflict	3.25	-0.026	0.334	-0.011	Y=27	3.25	0.013	0.630	0.005	Y=20
Family-work conflict	1.62	0.001	0.983	0.000	Y=28	1.62	0.014	0.735	0.006	Y=20
Work motivation	2.05	0.120	0.004	0.048	Y=27	2.05	-0.006	0.889	0.002	Y=20

Table 4. (continued)
Ordered Probit Model of Satisfaction and Organizational Commitment of Newly Licensed RNs (n=1,406)

	Satisfaction					Organizational Commitment				
		Estimates		Partial Effects			Estimates		Partial Effects	
Variable Name	Mean	Coefficient	*P*[|Z|>z]	ME [13]	Median	Mean	Coefficient	*P*[|Z|>z]	ME [16]	Median
Work Attributes										
Months worked in current job up to January 2006	10.8	-0.003	0.219	-0.001	Y=27	10.80	0.001	0.865	0.000	Y=20
Externship (no)	0.32	0.068	0.265	0.027	Y=27	0.32	0.002	0.969	0.001	Y=20
Magnet hospital (no)	0.30	-0.076	0.227	-0.031	Y=27	0.30	0.121	0.053	0.048	Y=20
Full time (part time) ≥35hrs/week	0.86	0.159	0.099	0.063	Y=27	0.86	0.296	0.002	0.117	Y=19
Hours of mandatory overtime	0.51	-0.029	0.040	-0.012	Y=27	0.51	-0.043	0.002	0.017	Y=20
Hours of voluntary overtime	3.35	0.017	0.012	0.007	Y=27	3.35	0.004	0.565	0.002	Y=20
Patient load	4.50	-0.042	0.017	-0.017	Y=27	4.50	-0.043	0.014	-0.017	Y=20
Type of shift (12 hours)										
8-hour shifts	0.17	0.165	0.108	0.065	Y=27	0.17	0.215	0.034	0.086	Y=20
10-hour shifts	0.01	0.043	0.912	0.017	Y=27	0.01	-0.262	0.484	-0.103	Y=19
Flexible schedule	0.03	0.063	0.700	0.025	Y=27	0.03	0.146	0.366	0.058	Y=20
Shift: Other	0.01	0.219	0.387	0.087	Y=28	0.01	-0.270	0.276	0.107	Y=19
Unit spent most of working time										
Step-down	0.16	-0.186	0.063	-0.074	Y=27	0.16	0.169	0.089	0.067	Y=20
General	0.57	-0.122	0.195	-0.048	Y=27	0.57	0.350	0.000	0.138	Y=20
Typical work schedule (day)										
Evening	0.09	0.066	0.603	0.026	Y=27	0.09	0.099	0.426	0.040	Y=20
Night	0.43	-0.002	0.973	-0.001	Y=27	0.43	0.051	0.470	0.020	Y=20
Rotating schedule	0.16	-0.002	0.984	-0.001	Y=27	0.16	-0.071	0.445	-0.028	Y=20
Number of times change in supervisor	0.39	-0.041	0.284	-0.017	Y=27	0.39	-0.054	0.161	-0.021	Y=20
Part of a union (no)	0.30	-0.082	0.216	-0.033	Y=27	0.30	-0.059	0.371	-0.023	Y=20
Work Attributes: Pay										
Importance of benefits from RN job to staying at job	3.37	0.082	0.020	0.033	Y=27	3.37	0.102	0.003	0.041	Y=20
Imputed wage	21.93	0.001	0.852	0.000	Y=27	21.93	0.004	0.423	0.002	Y=20
Total number of RN benefits	5.45	-0.051	0.134	-0.021	Y=27	5.45	0.039	0.253	0.016	Y=20
Affectivity										
Positive affectivity	3.55	0.087	0.059	0.035	Y=27	3.55	0.054	0.235	0.022	Y=20
Negative affectivity	2.66	0.135	0.0002	-0.054	Y=27	2.66	-0.077	0.030	-0.031	Y=20
Opportunity										
Local job opportunity	3.37	-0.129	0.0000	-0.052	Y=27	3.37	-0.146	0.000	-0.058	Y=20
Non-local job opportunity	3.59	-0.097	0.001	-0.039	Y=27	3.59	-0.159	0.000	-0.063	Y=20

Table 4. (continued)
Ordered Probit Model of Satisfaction and Organizational Commitment of Newly Licensed RNs (n=1,406)

	Satisfaction					Organizational Commitment				
		Estimates		Partial Effects			Estimates		Partial Effects	
Variable Name	Mean	Coefficient	*P*[|Z|>z]	ME [13]	Median	Mean	Coefficient	*P*[|Z|>z]	ME [16]	Median
Opportunity (continued)										
2002-03 Percent of all persons in HMOs	43.13	0.006	0.035	0.002	Y=27	43.13	-0.004	0.119	-0.002	Y=20
2004-05: Percent of physicians that say practice faces a very competitive market	19.66	0.006	0.153	-0.003	Y=27	19.66	0.001	0.828	0.000	Y=20
2004-05: Percent of physicians reporting that nursing support is better than 3 years ago	26.33	-0.008	0.056	-0.003	Y=27	26.33	-0.004	0.312	-0.002	Y=20
American Hospital Association: Beds per 1,000 population	3.11	-0.058	0.034	-0.023	Y=27	3.11	-0.028	0.312	-0.011	Y=20
Unemployment rate	5.09	-0.021	0.549	-0.009	Y=27	5.09	0.006	0.877	0.002	Y=20
Geographical size (large), rural, non MSA	0.15	-0.176	0.098	-0.070	Y=27	0.15	-0.106	0.316	-0.042	Y=20
Small and medium	0.22	-0.074	0.379	-0.030	Y=27	0.22	-0.095	0.255	-0.038	Y=20
Demographics										
Age in 2006	30.71	0.005	0.275	0.002	Y=27	30.71	-0.002	0.592	-0.001	Y=20
Gender (male)	0.92	0.269	0.012	0.107	Y=26	0.92	0.181	0.091	0.071	Y=20
Ethnic background (White)										
Other	0.05	-0.427	0.001	-0.169	Y=27	0.05	0.173	0.193	0.069	Y=20
White Hispanic	0.02	-0.178	0.390	-0.071	Y=27	0.02	0.164	0.429	0.065	Y=20
Black non-Hispanic	0.07	-0.155	0.191	-0.062	Y=30	0.07	0.016	0.891	0.007	Y=20
Black Hispanic	0.00	0.979	0.179	0.375	Y=26	0.00	-0.903	0.216	-0.345	Y=18
Asian	0.05	-0.408	0.002	-0.161	Y=27	0.05	-0.101	0.449	-0.040	Y=20
Rate overall health (good/very good/excellent), poor/fair	0.05	-0.039	0.758	-0.016	Y=27	0.05	-0.160	0.207	-0.063	Y=20
Total yearly spousal income	2.53	-0.002	0.878	-0.001	Y=27	2.53	-0.018	0.100	-0.007	Y=20
Yearly income from other sources	1.09	-0.009	0.059	-0.004	Y=27	1.09	0.004	0.424	0.002	Y=20
Kinship Responsibility										
Current marital status (Married or domestic partnership)	0.50	-0.042	0.724	-0.017	Y=27	0.50	0.103	0.374	.041	Y=20
Never married	0.42	-0.074	0.533	-0.029	Y=27	0.42	-0.018	0.875	-0.007	Y=20
Children less than 6 years old (all other)	0.18	-0.002	0.983	-0.001	Y=28	0.18	-0.172	0.029	-0.068	Y=20
General Training										
First nursing degree leading to RN license										
Diploma	0.03	0.199	0.238	0.079	Y=27	0.03	0.177	0.289	0.071	Y=20
Baccalaureate	0.46	-0.019	0.773	-0.007	Y=27	0.46	-0.055	0.382	-0.022	Y=20
Master's or doctoral	0.00	-.283	0.595	-0.112	Y=27	0.00	-0.643	0.233	-0.248	Y=19

[12] N varies due to missing data.
[13] Sum of marginal effects.

Table 5.
Ordered Probit Model for Search (n=1,632) and Intent to Stay (n=1,635)

Variable Name	Search (n=1,632)					Intent (n=1,635)				
		Estimates		Partial Effects			Estimates		Partial Effects	
	Mean	Coefficient	*P*[|Z|>z]	ME	Median	Mean	Coefficient	*P*[|Z|>z]	ME	Median
Constant		3.000	0.000				-0.008	-0.086		
Work Attitudes										
Organizational commitment	12.98	-0.015	0.079	-0.006	Y=09	12.98	0.136	0.000	0.054	Y=14
Job satisfaction	20.63	-0.006	0.220	-0.002	Y=09	20.64	0.067	0.000	0.027	Y=14
Search behavior	NA					4.33	-0.045	0.004	-0.018	Y=14
Variety	3.36	-0.003	0.940	-0.001	Y=09	3.36	-0.042	0.330	-0.017	Y=14
Autonomy	3.73	0.056	0.147	0.022	Y=09	3.73	0.081	0.034	0.032	Y=14
Supervisory support	3.54	0.000	0.998	0.000	Y=08	3.54	-0.071	0.036	-0.028	Y=14
Workgroup cohesion	4.05	-0.005	0.908	-0.002	Y=09	4.05	0.000	0.997	0.000	Y=14
Distributive justice	2.84	0.052	0.158	0.021	Y=09	2.84	0.050	0.173	0.020	Y=14
Promotional opportunities	3.40	-0.071	0.093	-0.028	Y=09	3.40	0.110	0.009	0.044	Y=14
Procedural justice	3.31	0.069	0.143	0.027	Y=09	3.31	0.020	0.665	0.008	Y=14
Quantitative workload	4.09	0.035	0.289	0.014	Y=09	4.09	-0.014	0.662	-0.006	Y=14
Organizational constraints	2.46	-0.002	0.963	-0.001	Y=09	2.45	-0.015	0.723	-0.006	Y=14
Mentor support	3.04	-0.065	0.149	-0.026	Y=09	3.04	0.073	0.104	0.029	Y=14
Collegial RN-MD relations	2.82	0.026	0.603	0.010	Y=09	2.82	0.062	0.204	0.025	Y=14
Work-family conflict	3.26	0.012	0.633	0.005	Y=09	3.26	-0.018	0.467	-0.007	Y=14
Family-work conflict	1.62	-0.032	0.387	-0.013	Y=09	1.62	0.031	0.402	0.012	Y=14
Work motivation	2.07	0.034	0.355	0.014	Y=09	2.07	-0.010	0.793	-0.004	Y=14
Positive affectivity	3.55	-0.044	0.291	-0.018	Y=09	NA				
Negative affectivity	2.67	-0.004	0.905	-0.002	Y=09	NA				
Opportunity										
Local job opportunity	3.38	0.060	0.030	0.024	Y=09	3.37	-0.071	0.010	-0.028	Y=14
Non-local job opportunity	3.58	-0.029	0.271	-0.012	Y=09	3.58	-0.116	0.000	-0.046	Y=14
2002-03 Percent of persons of all persons in HMOs	43.19	0.000	0.965	0.000	Y=09	43.17	-0.001	0.787	-0.000	Y=14
2004-05 Percent of physicians that say practice faces a very competitive market	19.56	0.001	0.892	0.000	Y=09	19.54	-0.003	0.438	-0.001	Y=14
2004-05 Percent of physicians reporting that nursing support is better than 3 years ago	26.31	-0.002	0.554	-0.001	Y=09	26.31	-0.001	0.785	-0.000	Y=14
American Hospital Association: Beds per 1,000 Population	3.11	0.025	0.238	0.010	Y=09	3.11	-0.023	0.287	-0.009	Y=14
Demographics										
Age in 2006	30.93	-0.006	0.113	-0.003	Y=09	30.95	0.012	0.003	0.005	Y=14
Gender (male)	0.922	-0.092	0.347	-0.037	Y=09	0.92	0.178	0.067	0.071	Y=14
Ethnic background (White) Other	0.05	-0.100	0.400	-0.039	Y=09	0.05	0.007	0.951	0.003	Y=14
White Hispanic	0.02	-0.045	0.815	-0.018	Y=09	0.02	0.108	0.575	0.043	Y=14
Black Non-Hispanic	0.07	-0.128	0.236	-0.050	Y=09	0.07	0-.117	0.274	-0.047	Y=14
Black Hispanic	0.00	-0.673	0.360	-0.257	Y=08	0.00	-0.248	0.731	-0.099	Y=14
Asian	0.05	0.076	0.521	0.030	Y=09	0.05	0.102	0.388	0.040	Y=14
Rate overall health (good/very good/excellent) poor/fair	0.05	-0.031	0.790	-0.012	Y=09	0.05	0.093	0.421	0.037	Y=14
Spousal income	2.58	0.010	0.347	0.004	Y=09	2.58	0.022	0.028	0.009	Y=14
Yearly income from other sources	1.13	-0.010	0.034	-0.004	Y=09	1.13	-0.005	0.266	-0.002	Y=14

Table 5. (continued)
Ordered Probit Model for Search (n=1,632) and Intent to Stay (n=1,635)

Variable Name	Search (n=1,632)					Intent (n=1,635)				
		Estimates		Partial Effects			Estimates		Partial Effects	
	Mean	Coefficient	*P*[|Z|>z]	ME	Median	Mean	Coefficient	*P*[|Z|>z]	ME	Median
Kinship Responsibilities										
Current marital status (married or domestic partnership)	0.507	-0.166	0.118	-0.066	Y=09	0.51	0.082	0.441	0.032	Y=14
Never married	0.41	-0.014	0.898	-0.005	Y=09	0.41	-0.002	0.987	-0.001	Y=14
Children less than 6 years old (all other)	0.18	-0.069	0.336	-0.027	Y=09	0.18	0.069	0.331	0.027	Y=14
General Training										
First nursing degree leading to RN licensure										
Diploma	0.03	0.135	0.377	0.054	Y=09	0.03	0.167	0.272	0.066	Y=14
Baccalaureate	0.44	-0.017	0.765	-0.007	Y=09	0.44	-0.194	0.001	-0.077	Y=14
Master's or doctoral	0.00	-0.120	0.822	-0.047	Y=09	0.00	0.868	0.099	0.335	Y=14
Work Attributes: Pay										
Imputed wage	21.91	-0.003	0.549	-0.001	Y=09	21.92	-0.004	0.352	-0.002	Y=14
Total number of RN benefits	5.44	-0.053	0.091	-0.021	Y=09	5.44	0.040	0.199	0.016	Y=14

policymakers are concerned with not only whether changes in the predictors will impact the variables of interest such as intent to stay, but what level of change in intent to leave can be expected from an investment in improving variables such as distributive justice. First, it is important to identify what variables management or government can change. Some variables are easier to manipulate than others. For example, it may be easier for organizations to decrease organizational constraints (e.g., by providing adequate equipment and supplies), than to improve nurse-physician relationships. Second, changes in the variables in the model that improve the dependent variables of interest are cumulative. Thus, increasing the perception of procedural justice by one unit will be associated with a 1.15% probability of an increase in organizational commitment being 20 or above and with a 0.44% probability of satisfaction being 27 or higher. Similarly, increasing autonomy by one unit will be related to an increased probability of satisfaction being 27 or higher, by organizational commitment being 20 and higher, and intent being 14 and higher. The decision to make these organizational changes identified above will depend on the relative costs of making the changes and the benefits of decreasing turnover. Each organization may have different ways of addressing each issue that need to be evaluated and prioritized.

Although the model focuses on areas over which organizations have primary control, there are areas in which government could also impact nurses' satisfaction, organizational commitment, search behavior, and/or intent to stay. Mandatory overtime and patient load are examples. There have been many attempts (some of them successful) to enact legislation limiting mandatory overtime (Berney & Needleman, 2006; Caruso, Hitchcock, Dick, Russo, & Schmit, 2004; Scott, Hwang, & Rogers, 2006 ; Trinkoff et al., 2006) and to limit the number of patients for whom RNs provide care (requiring specific nurse-to-patient staffing ratios) (Coffman, Seago, & Spetz, 2002; Kovner, 2000; Seago, Spetz, Coffman, Rosenoff, & O'Neil, 2003). Doing so might exacerbate the nursing shortage in the short term.

NLRNs are an important part of the nursing workforce and needed to replace RNs who will retire in the next 10 years. In 2004, 85,423 people who took the NCLEX for the first time passed, while 15,998 passed it on the second or later try (Kenward, O'Neill, Reynolds, & White, 2005). In their first year of work, 87% work in hospitals (Kovner et al., 2007). Retaining these NLRNs in the hospital workforce will require improving working conditions that impact satisfaction and organizational commitment. Patient load and overtime have not been included in other intent models, so we do not know if these are more important to NLRNs than to the RN workforce in general. Clearly they are important to NLRNs.

Our model fits the data well and provides estimates that are potentially useful to organizations and government. Organizations and government are interested in decreasing turnover because of the costs and disruption such turnover produces in health care. Findings

from this study provide information that may be useful for those organizations that want to decrease their turnover rates. **$**

REFERENCES

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*(16), 1987-1993.

Alexander, J.A., Lichtenstein, R., Oh, H.J., & Ullman, E. (1998). A causal model of voluntary turnover among nursing personnel in long-term psychiatric settings. *Research in Nursing & Health, 21*(5), 415-427.

American Association for Public Opinion Research. (2004). *Standard definitions: Final dispositions of case codes and outcome rates for surveys* (3rd ed.). Lexana, KS: Author.

Auerbach, D.I., Buerhaus, P I., & Staiger, D.O. (2007). Better late than never: Workforce supply implications of later entry into nursing. *Health Affairs, 26*(1), 178-185.

Baruch, Y., & Winkelmann-Gleed, A. (2002). Multiple commitments: A conceptual framework and empirical investigation in a community health service trust. *British Journal of Management, 13*, 337-357.

Berney, B., & Needleman, J. (2006). Impact of nursing overtime on nurse-sensitive patient outcomes in New York hospitals, 1995-2000. *Policy, Politics, & Nursing Practice, 7*(2), 87-100.

Blau, G. (1993). Further exploring the relationship between job search and voluntary individual turnover. *Personnel Psychology, 46*(2), 313-330.

Blau, G. (1994). Testing a two-dimensional measure of job search behavior. *Organizational Behavior and Human Decision Processes, 59*(2), 288-312.

Borda, R.G., & Norman, I.J. (1997). Testing a model of absence and intent to stay in employment: A study of registered nurses in Malta. *International Journal of Nursing Studies, 34*(5), 375-384.

Brewer, C.S., Kovner, C.T., Wu, Y.-W., Greene, W., Liu, Y., & Reimers, C.W. (2006). Factors influencing female registered nurses' work behavior. *Health Services Research, 41*(3), 860-866.

Caruso, C., Hitchcock, E.M., Dick, R.B., Russo, J.M., & Schmit, J.M. (2004). *Overtime and extended work shifts: Recent findings on illnesses, injuries and health behaviors* (DHHS [NIOSH] Publication No. 2004-143). Washington, DC: US Department of Health and Human Services, Centers for Disease Control and Prevention, National Institute for Occupational Safety and Health.

Center for Studying Health System Change. (2003). *Community tracking study site-county crosswalk, 2000-2001, Technical publication No.39.* Washington, DC: Author.

Chan, E., & Morrison, P. (2000). Factors influencing the retention and turnover intentions of registered nurses in a Singapore hospital. *Nursing & Health Sciences, 2*(2), 113-121.

Chiha, Y. A., & Link, C. R. (2003). The shortage of registered nurses and some new estimates of the effects of wages on registered nurses labor supply: A look at the past and a preview of the 21st century. *Health Policy, 64*(3), 349-375.

Coffman, J.M., Seago, J.A., & Spetz, J. (2002). Minimum nurse-to-patient ratios in acute care hospitals in California. *Health Affairs, 21*(5), 53-64.

Dillman, D.A. (2000). *Mail and Internet surveys: The tailored design method*. New York: Wiley.

Dockery, A.M. (2004). Workforce experience and retention in nursing in Australia. *Australian Bulletin of Labour, 30*(2), 74-100.

Ehrenberg, R.G., & Smith, R.S. (2006). *Modern labor economics: Theory and public policy* (9th ed.). Boston: Addison-Wesley.

Fields, D.L. (2002). *Taking the measure of work: A guide to validated scales for organizational research and diagnosis*. Thousand Oaks, CA: Sage Publications, Inc.

Francis-Felsen, L.C., Coward, R.T., Hogan, T.L., Duncan, R.P., Hilker, M.A., & Horne, C. (1996). Factors influencing intentions of nursing personnel to leave employment in long-term care settings. *Journal of Applied Gerontology, 15*(4), 450-470.

Frone, M.R., Yardley, J.K., & Markel, K.S. (1997). Developing and testing an integrative model of the work-family interface. *Journal of Vocational Behavior, 50*(2), 145-167.

Gaertner, S. (1999). Structural determinants of job satisfaction and organizational commitment in turnover models. *Human Resource Management Review, 9*(4), 479-493.

Greene, W. (2008). *Econometric analysis* (6th ed.). Upper Saddle River, NJ: Prentice Hall.

Gregory, D.M., Way, C.Y., LeFort, S., Barrett, B.J., & Parfrey, P.S. (2007). Predictors of registered nurses' organizational commitment and intent to stay. *Health Care Management Review, 32*(2), 119-127.

Griffeth, R.W., Hom, P.W., & Gaertner, S. (2000). A meta-analysis of antecedents and correlates of employee turnover: Update, moderator tests, and research implications for the next millennium. *Journal of Management, 26*(3), 463-488.

Group, T.H. (2002). Acute care hospital survey of RN vacancy and turnover rates in 2000. *Journal of Nursing Administration, 32*(9), 437-439.

Grzywacz, J.G., Frone, M.R., Brewer, C.S., & Kovner, C.T. (2006). Quantifying work-family conflict among registered nurses. *Research in Nursing & Health, 29*(5), 414-426.

Gurney, C.A. (1990). Determinants of intent to leave among nurses with doctoral degrees. *Dissertation Abstracts International, 51*(11), 5245. (UMI No. 9107506).

Gurney, C.A., Mueller, C.W., & Price, J.L. (1997). Job satisfaction and organizational attachment of nurses holding doctoral degrees. *Nursing Research, 46*(3), 163-171.

Hayes, L.J., O'Brien-Pallas, L., Duffield, C., Shamian, J., Buchan, J., Hughes, F., et al. (2006). Nurse turnover: A literature review. *International Journal of Nursing Studies, 43*(2), 237-263.

Holtom, B., & O'Neill, B. (2004). Job embeddedness: A theoretical foundation for developing a comprehensive nurse retention plan. *Journal of Nursing Administration, 34*(5), 216-227.

Hom, P.W., & Griffeth, R.W. (1991). Structural equations modeling test of a turnover theory: Cross-sectional and longitudinal analyses. *Journal of Applied Psychology, 76*, 350-366.

Hom, P.W., & Griffeth, R.W. (1995). *Employee turnover*. Cincinnati, OH: South-Western.

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*(5), 250-263.

Irvine, D.M., & Evans, M.G. (1995). Job satisfaction and turnover among nurses: Integrating research findings across studies. *Nursing Research, 44*(4), 246-253.

Jones, C.B. (2004). The costs of nurse turnover: part 1: An economic perspective. *Journal of Nursing Administration, 34*(12), 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, 35*(1), 41-49.

Karsh, B., Booske, B.C., & Sainfort, F. (2005). Job and organizational determinants of nursing home employee commitment, job satisfaction and intent to turnover. *Ergonomics, 48*(10), 1260-1281.

Kenward, K., & Zhong, E. (2006). *Report of findings from the practice and professional issues survey, Fall 2004*. Chicago: National Council of State Boards of Nursing.

Kenward, K., O'Neill, T., Reynolds, M., & White, E. (2005). *2004 nurse licensee volume and NCLEX® examination statistics*. Chicago, IL: National Council of State Board of Nursing. Retrieved February 5, 2009 from https://www.ncsbn.org/LES_2004.pdf

Kim, S., Price, J.L., Mueller, C.W., & Watson, T.W. (1996). The determinants of career intent among physicians at a U.S. Air Force hospital. *Human Relations, 49*(7), 947-976.

Kovner, C.T., Brewer, C.S., Fairchild, S., Poornima, S., Kim, H., & Djukic, M. (2007). Newly licensed RNs' characteristics, work attitudes, and intentions to work. *The American Journal of Nursing, 107*(9), 58-70.

Kovner, C.T. (2000). State regulation of RN-to-patient ratios. *American Journal of Nursing, 100*(11), 61-63, 65.

Kuokkanen, L., Leino-Kilpi, H., & Katajisto, J. (2003). Nurse empowerment, job-related satisfaction, and organizational commitment. *Journal of Nursing Care Quality, 18*(3), 184-192.

Lake, E.T. (1998). Advances in understanding and predicting nurse turnover. *Research in the Sociology of Health Care, 15*, 147-171.

Lake, E.T. (2002). Development of the practice environment scale of the nursing work index. *Research in Nursing & Health, 25*(3), 176-188.

Larrabee, J.H., Janney, M.A., Ostrow, C.L., Withrow, M.L., Hobbs, G.R., Jr., & Burant, C. (2003). Predicting registered nurse job satisfaction and intent to leave. *Journal of Nursing Administration, 33*(5), 271-283.

Lu, H., While, A.E., & Barriball, K.L. (2005). Job satisfaction among nurses: A literature review. *International Journal of Nursing Studies, 42*(4), 211-227.

Lu, K., Lin, P., Wu, C., Hsieh, Y., & Chang, Y. (2002). The relationships among turnover intentions, professional commitment, and job satisfaction of hospital nurses. *Journal of Professional Nursing, 18*(4), 214-219.

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*(3), 305-320.

Lynn, M.R., & Redman, R.W. (2005). Faces of the nursing shortage: Influences on the staff nurses' intentions to leave their positions or nursing. *Journal of Nursing Administration, 35*(5), 264-270.

McKelvey, R., & Zavoina, W. (1975). A statistical model for the analysis of ordinal level dependent variables. *Journal of Mathematical Sociology, 4*, 103-120.

National League for Nursing. (2006). *Nursing data review academic year 2004-2005: Baccalaureate, associate degree, and diploma programs*. New York: National League for Nursing.

Pisarski, A., Brook, C., Bohle, P., Gallois, C., Watson, B., & Winch, S. (2006). Extending a model of shift-work tolerance. *Chronobiology International, 23*(6), 1363-1377.

Prevosto, P. (2001). The effect of "mentored" relationships on satisfaction and intent to stay for company-grade U.S. Army reserved nurses. *Military Medicine, 166*(1), 21-26.

Price, J.L. (2001). Reflections on the determinants of voluntary turnover. *International Journal of Manpower, 22*(7), 600-624.

Price, J.L. (2004). The development of a causal model of voluntary turnover. In R. Griffeth, & P.W. Hom (Eds.), *Innovative theory and empirical research on employee turnover* (pp. 3-34). Greenwich, CT: Information Age Publishing.

Price, J.L., & Kim, S. (1993). The relationship between demographic variables and intent to stay in the Military: Medical personnel in a U.S. Air Force Hospital. *Armed Forces & Society, 20*(1), 125-144.

Quinn, R.P., & Staines, G.L. (1979). *The 1977 quality of employment survey: Descriptive statistics, with comparison data from the 1969-70 and the 1972-73 surveys*. Ann Arbor, MI: Survey Research Center, Institute for Social Research, University of Michigan.

Rambur, B., Palumbo, M.V., McIntosh, B., & Mongeon, J. (2003). A statewide analysis of RNs' intention to leave their position. *Nursing Outlook, 51*(4), 182-188.

Roberts, B.J., Jones, C., & Lynn, M. (2004). Job satisfaction of new baccalaureate nurses. *Journal of Nursing Administration, 34*(9), 428-435.

Ruggiero, J.S., & Pezzino, J.M. (2006). Nurses' perceptions of the advantages and disadvantages of their shift and work schedules. *Journal of Nursing Administration, 36*(10), 450-453.

Schmalenberg, C., & Kramer, M. (2008). Essentials of a productive nurse work environment. *Nursing Research, 57*(1), 2-13.

Scott, J.G.M., Sochalski, J., & Aiken, L. (1999). Review of Magnet hospital research: Findings and implications for professional nursing practice. *Journal of Nursing Administration, 29*(1), 9-19.

Scott, L.D., Hwang, W.T., & Rogers, A.E. (2006 Feb). The impact of multiple care giving roles on fatigue, stress, and work performance among hospital staff nurses. *Journal of Nursing Administration, 36*(2), 86-95.

Seago, J.A., Spetz, J., Coffman, J., Rosenoff, E., & O'Neil, E. (2003). Minimum nurse to patient ratios: The California workforce initiative survey. *Nursing Economic$, 21*(2), 65-70.

Shader, K., Broome, M.E., Broome, C.D., West, M.E., & Nash, M. (2001). Factors influencing satisfaction and anticipated turnover for nurses in an academic medical center. *Journal of Nursing Administration, 31*(4), 210-216.

Shields, M.A., & Ward, M. (2001). Improving nurse retention in the National Health Service in England: The impact of job satisfaction on intentions to quit. *Journal of Health Economics, 20*(5), 677-701.

Smith, A.P. (2006). Paving and resurfacing the road to Magnet: The perspective and wisdom of Magnet-designated coordinators-part I. *Nursing Economic$, 24*(2), 112-115.

Spector, P.E., & Jex, S.M. (1998). Development of four self-report measures of job stressors and strain: Interpersonal conflict at work scale, organizational constraints scale, quantitative workload inventory, and physical symptoms inventory. *Journal of Occupational Health Psychology, 3*(4), 356-367.

Squires, A. (2002). New graduate orientation in the rural community hospital. *The Journal of Continuing Education in Nursing, 33*(5), 203-209.

Stone, P.W., Du, Y., Cowell, R., Amsterdam, N., Helfrich, T.A., Linn, R.W., et al. (2006). Comparison of nurse, system and quality patient care outcomes in 8-hour and 12-hour shifts. *Medical Care, 44*(12), 1099-1106.

Stordeur, S., D'Hoore, W., & NEXTStudy Group. (2007). Organizational configuration of hospitals succeeding in attracting and retaining nurses. *Journal of Advanced Nursing, 57*(1), 45-58.

Strachota, E., Normandin, P., O'Brien, N., Clary, M., & Krukow, B. (2003). Reasons registered nurses leave or change employment status. *Journal of Nursing Administration, 33*(2), 111-117.

Tai, T.W., Bame, S.I., & Robinson, C.D. (1998). Review of nursing turnover research, 1977-1996. *Social Science & Medicine, 47(12)*, 1905-1924.

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*(2), 205-226.

Tett, R.P., & Meyer, J.P. (1993). Job satisfaction, organizational commitment, turnover intention, and turnover: Path analyses based on meta-analytic findings. *Personnel Psychology, 46*(2), 259-293.

The Center for Nursing Advocacy. (2008).

What is Magnet status and how's that whole thing going? Retrieved January 18, 2008, from http://www.nursingadvocacy.org/faq/magnet.html

Trinkoff, A., Geiger-Brown, J., Brady, B., Lipscomb, J., & Muntaner, C. (2006). How long and how much are nurses now working? *American Journal of Nursing, 106*(4), 60-71.

Tzeng, H.M. (2002). The influence of nurses' working motivation and job satisfaction on intention to quit: An empirical investigation in Taiwan. *International Journal of Nursing Studies, 39*(8), 867-878.

U.S. Department of Health and Human Services. (2002). *Projected supply, demand, and shortages of registered nurses: 2000-2020.* Washington, DC: Author.

Vadala, G. (2007). *Higher job satisfaction among nurses in award winning organizations, study finds.* CQ HealthBeat News. Retrieved June 7, 2007, from http://www.cq.com/display.do?dockey=/cqonline/prod/data/docs/html/hbnews/110/hbnews110-000002517328.html@allnews&metapub=CQ-HBNEWS&searchIndex=0&seqNum=2&productId=5

Van Hooft, E.A.J., Born, M.P., Taris, T.W., Flier, H.V.D., & Blonk, R.W.B. (2004). Predictors of job search behavior among employed and unemployed people. *Personnel Psychology, 57*(1), 25-59.

Waldman, J.D., Kelly, F., Arora, S., & Smith, H.L. (2004). The shocking cost of turnover in health care. *Health Care Management Review, 29*(1), 2-7.

Watson, D., & Tellegen, A. (1985). Towards a consensual structure of mood. *Psychological Bulletin, 98*(2), 219-235.

Way, C.Y., Gregory, D.M., Davis, J., Baker, N., LeFort, S., Barrett, B.J., et al. (2007). The impact of organizational culture on clinical managers' organizational commitment and turnover intentions. *The Journal of Nursing Administration, 37*(5), 235-242.

Zangaro, G.A., & Soeken, K.L. (2007). A meta-analysis of studies of nurses' job satisfaction. *Research in Nursing & Health, 30*(4), 445.