Predicting Transitions in the Nursing Workforce: Professional Transitions from LPN to RN

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I. Introduction and Background

The Institute of Medicine Future of Nursing Report[1] called for increasing the percentage of registered nurses (RNs) prepared with a baccalaureate degree to 80%, and doubling the percent of RNs prepared with a doctorate by 2020. Implementing the IOM recommendations and broader health care reform policies requires understanding and cultivating flexibility in the professional development of the nursing workforce. An important approach to meeting the growing demand for RNs is therefore to promote the transitions of licensed vocational nurses or practical nurses (LPN) to RNs.

Also, because only 57% of the LPN workforce is white, compared to about 80% of the RN workforce[2], promoting LPN to RN transitions could bring much needed diversity to the RN workforce. Despite calls to improve the racial/ethnic diversity of the nursing workforce, increasing the proportion of underrepresented minorities in the RN workforce remains a challenge[3]. Improving our understanding of the factors that predict the transition of LPNs to become RNs could help to identify factors that could be modified through policy interventions to achieve a more educated and diverse RN workforce.

CONCLUSIONS AND IMPLICATIONS FOR POLICY

1) Little is known about the factors that affect LPN to RN career transitions.

2) Characteristics of LPNs that predict LPN to RN transition are: LPN licensure from 1996-2013; licensure at a younger age; LPN education in the US; employment in a hospital setting; part-time employment; and specializing in medical/surgical nursing.

3) To encourage LPN to RN transitions, develop: resources about the nursing career ladder for LPN students; incentives for employers to foster LPN career development; curricula for LPNs to train at the associate degree and transition to the baccalaureate degree in nursing; and consensus among national and local stakeholders to promote the value of LPNs who become RNs as a way of increasing diversity in the RN workforce.

4) Further research is needed to shed light on the barriers to and facilitators of LPN to RN transitions to better understand the policy levers that would accelerate these transitions.

Despite the fact that the US nursing workforce includes greater than 690,000 LPNs, prior research has rarely examined the professional development of LPNs as they transition to RNs. As LPNs progress to the RN role, they "transfer" the knowledge, skills, and training (i.e., human capital) from earlier educational and work experiences to their new RN roles. Similarly, among a subset of practicing LPNs, the transition to the RN role is viewed as a natural pathway to greater autonomy and income in nursing practice; yet, data are not available to identify the factors that support aspiring nurses as they make the personal sacrifices to advance their education and increase satisfaction with their nursing careers. Finally, policymakers lack evidence needed to develop incentives and recruit greater numbers of LPNs to train for the RN role.

In previous research[4] funded under the Carolina Health Workforce Research Center (Project Title: Modeling to Predict Role Transitions for the LPN-to-RN Workforce in North Carolina), we described the number of LPN to RN professional transitions in North Carolina from the years 2001 to 2013, and the demographic and professional characteristics of LPNs who transitioned to the RN role. These findings facilitated a detailed description of LPN to RN professional transitions in North Carolina; however, it was beyond the scope of that study to move from descriptive to multivariate analyses of factors associated with LPN to RN transitions.

In this project, we examined the professional trajectories of LPNs and described predictors of their transitions to the RN role, including demographic characteristics (e.g., age, gender and self-reported race), professional characteristics (e.g., setting of LPN employment, specialty as a LPN, years since licensed as a LPN, full time versus part time employment and Area Health Education Centers (AHEC) in North Carolina, educational degrees (e.g. highest degree in nursing in last year as an LPN, country of LPN education), geographic location (e.g., rural versus urban address and others), and, as available, socio-economic factors (e.g., unemployment status).

II. Hypotheses

Our hypothesis was that demographic, geographic, professional and socio-economic factors of LPNs would be significant predictors of professional transitions from the LPN to the RN role. The study had two aims:

- **Aim 1:** Describe the occurrence of professional transitions from the role of LPN to RN;
- **Aim 2:** Describe the demographic, professional, educational, geographic, and socio-economic factors that are associated with the transition of LPNs to the role of RN.

III. Data and Methods

A retrospective cohort design was used to study LPN to RN professional transitions. We examined annual data from 2001 to 2013, maintained in the Health Professions Data System (HPDS) on the RN and LPN nursing workforce in North Carolina (NC), derived from annual licensure files provided by the NC Board of Nursing. A model of the key predictors of LPN to RN transition was developed in our previous project, which was constructed using this same HPDS dataset. Logistic regression analyses were conducted to model the professional transitions from the LPN to RN role.

IV. Findings

To describe the occurrence of professional transitions from the role of LPN to RN (Aim 1), we used available data on LPN to RN transitions for 37,781 LPNs during the period 2001-2013. A total of 3,162 or 8.4% of these LPNs transitioned to an RN during this period.

To describe the factors that predict transition of LPNs to the role of RN (Aim 2), we used the predictors of LPN to RN transitions that are described in the text and **Table 1** (page 4). Categories for each predictor were ordered from least to most likely to have a transition. Table 1 shows the results of the logistic regressions in terms of odds ratios (OR) that account for the other predictors in the model.

The logistic regression model was constructed by coding the dependent variable to equal 1 if an LPN made a transition to RN, or 0 if the LPN did not make a transition. Eleven independent variables were considered for inclusion in the LPN to RN transition model: gender (male vs. female), race (Hispanic, White, Black, American Indian, Asian, other), age at first LPN licensure (16-22, 23-27, 28-34, 34-68), year of first LPN licensure (1938-1981, 1981-1995, 1996-2004, 2005-2013), country of LPN schooling (US, other), highest nursing degree in last year as an LPN (diploma, associate, BSN, MSN/doctorate), work setting in last year as an LPN (solo/group practice, hospital outpatient, long-term care, hospital inpatient, other), specialty in last year as an LPN (community based practice, pediatrics, geriatrics, medical/surgical, other), employment in last year as an LPN (full-time, part-time), living in a rural area in last year as an LPN (yes, no), and NC AHEC of residence in last year as an LPN (Charlotte, Northwest, Greensboro, Wake, Eastern, Southern, South East, Mountain, Area L). Data were used from 28,337 LPNs with no missing data on all 11 predictors.

Models were evaluated using the well-established penalized likelihood criterion called the Akaike Information Criterion (AIC). The addition of a predictor to a model was assessed using a χ^2 test comparing the AIC score for the model with the predictor included to the AIC score for the model without the predictor included. These tests are more conservative than the standard likelihood ratio test because the AIC score is based on a penalty factor as well as the likelihood. Moreover, we conservatively conducted these tests at $p<0.001$ due to the large sample size.

First we compared models based on each predictor separately to the constant model. Gender, race, and highest nursing degree in the last year as an LPN were non-significant and so were dropped from further consideration, leaving the other 8 possible predictors. Subsequent analyses used data for the 30,216 LPNs with no missing data for these 8 predictors. The next predictor added to the model at each analysis stage was the one generating the best AIC score when added to the model generated at the prior stage. The analysis stopped when all the remaining predictors generated a non-significant change in the AIC score. This left the model of Table 1 based on 6 of the 8 predictors, not including living in a rural area in last year as an LPN and NC AHEC of residence in last year as an LPN. To assess whether any of these 6 predictors could be removed from the model, we compared the AIC scores for the model with each predictor removed to the model based on all 6 predictors. There was a significant decrease in the AIC score in all 6 cases indicating that

all 6 predictors are of importance for modeling having an LPN to RN transition.

The findings for this model are summarized in **Table 1**. Predictors are listed in the table in order of importance for predicting LPN to RN transitions.

The first predictor was time of LPN licensure. Compared to LPNs licensed from 1938 to 1981, LPNs licensed after 1982 were 7.44 to 21.2 times more likely to become licensed as a RN. Additionally, LPNs licensed between 1982 and 1995 (with the smallest OR of 7.44 in Table 1) are compared with LPNs licensed between 1996 and 2004 (the largest OR of 21.2 in Table 1), LPNs licensed in the earlier period were 2.85 times more likely to become licensed as a RN with a 95% confidence interval (CI) of 2.55-3.19 (a comparison not reported in Table 1 for brevity).

The second predictor was age of first LPN licensure. Compared to LPNs aged 35-68 years, LPNs licensed before age 35 were 1.69 to 2.56 times more likely to become licensed as an RN.

The third predictor was country of nursing education prior to receiving LPN licensure. Compared to LPNs educated outside of the US, LPNs educated in the US were 8.57 times more likely to become licensed as an RN.

The fourth predictor was LPN work setting. Compared to LPNs working in a solo/group/hospital outpatient practice, LPNs in hospital inpatient settings were 3.54 times more likely to become licensed as an RN and LPNs in long term care settings were 1.56 times more likely to become licensed as an RN. Additionally, when compared to LPNs working in long term care (with the lower of these two ORs), LPNs working in the hospital inpatient setting (the larger of these two ORs) were 2.28 times more likely to become licensed as an RN, with a 95% CI of 1.89-2.74 (again, a comparison not reported in Table 1 for brevity).

Table 1. Predictors of LPN to RN Transitions

Variable	Setting	Referent Group	Odds Ratio	Confidence Interval (95%)
Time of LPN licensure	1982 - 1995	1938-1981	7.44	5.90 - 9.38
	2005 - 2013		16.9	13.4 - 21.4
	1996 - 2004		21.2	16.9 - 26.6
Age at LPN licensure	28 - 34	35-68	1.69	1.48 - 1.93
	23 - 27		2.23	1.95 - 2.53
	16 - 22		2.56	2.23 - 2.95
Country of LPN education	US	Outside of US	8.57	5.19 - 14.2
Work setting	Other**	Solo/group or hospital outpatient	1.03	0.88 - 1.21[*]
	Long term care		1.56	1.28 - 1.89
	Hospital inpatient		3.54	2.97 - 4.21
Employment status	Part time	Full time	1.86	1.67 - 2.06
Specialty	Community-based	Geriatrics	1.01	0.81 - 1.25[*]
	Other		1.12	0.95 - 1.32[*]
	Pediatrics		1.22	0.96 - 1.54[*]
	Medical/Surgical		1.80	1.45 - 2.22

[*] Odds ratios are adjusted for other predictors in the model. Significance is indicated by confidence intervals that do not contain the number 1.
[**] Other = HMO/insurance company, home care/hospice, public clinic/health department, mental health facility, student health site, industry/manufacturing site, private duty, school of nursing, and other.

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The fifth predictor was employment status. Compared to LPNs who worked full time, LPNs working part time were 1.86 times more likely to become licensed as an RN.

The final predictor was specialty. Only one specialty, medical-surgical, significantly predicted LPN to RN transitions relative to LPNs with a geriatric specialty. This finding suggested that it was appropriate to group together all LPNs from specialties other than medical-surgical and compare them to LPNs who reported the specialty focus of medical-surgical. Compared to LPNs from all other specialties, LPNs with a medical/surgical specialty background were 1.63 times more likely to become licensed as a RN, with a 95% CI of 1.39-1.91 (a comparison not reported in Table 1 for brevity).

V. Policy Implications

Our findings suggest the possibility of creating policy interventions that target factors that increase the likelihood of LPN to RN transitions. We recommend that new HRSA programs and resources:

a) develop resources (e.g., website, printed materials) about the nursing career ladder and advancement opportunities that can be disseminated to educational programs and LPN students;

b) provide incentives for employers of LPNs, particularly hospitals and long term care facilities, to create employment arrangements that foster LPN career advancement (e.g., flexible staffing, reduced work time, retention programs targeting LPNs who transition, or tuition support);

c) provide incentives for LPNs working in the medical-surgical specialty (e.g., loan repayment programs) that encourage LPNs to advance to become RNs;

d) develop resources that standardize curricula and other educational materials for LPNs to train at the associate degree and transition to the baccalaureate degree in nursing;

e) convene meetings of key national and local stakeholders to begin changing the mindset about LPN-to-RN transitions and promote the value of LPNs who become RNs as a way of increasing diversity in the RN workforce, expanding the pipeline of RNs who will provide care in local communities, and building local communities through the advancement of educational opportunities; and

f) offer online and other flexible learning opportunities for LPNs to remain employed and within their local communities while pursuing the RN degree.

V. Conclusions

Prior studies have not examined the characteristics of LPNs who transition to RNs, therefore, this study addresses an important gap in our knowledge. While much remains unknown about the LPNs who transition to RNs, this study identified six characteristics of LPNs that were associated with greater likelihood of an LPN to RN transition. The characteristics of LPN-to-RN transitions included LPN licensure between 1996-2013, especially between 1996 and 2004; licensure at a younger age; nursing education in the US; employment in a hospital inpatient setting; part-time employment; and medical/surgical nursing specialty. Advancing our knowledge of the transition of LPNs who become RNs can be used to increase the number of nurses that

make this professional transition. Improving our understanding of the characteristics of LPN-to-RN transitions is useful in developing strategies to support LPN-to-RN transitions, including strategies that focus on individuals enrolled in LPN programs, LPN programs, and the employers of LPNs. Efforts to bring together key thought leaders from academia, service, and policy are needed to begin to change the mindset about LPNs to value their potential to expand and bring diversity to the RN workforce. ❖

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