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Title: Effect of prior health-related employment on the registered nurse workforce supply

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Brief Abstract

This analysis of 2008 National Sample Survey of Registered Nurses (NSSRN) found that registered nurses (RNs) with prior health-related employment were more likely to work as RNs and work longer hours than those without such prior experience.

Abstract

Background: Registered Nurses (RN) who held prior health-related employment in occupations other than licensed practical or vocational nursing (LPN/LVN) are reported to have increased rapidly in the past decades. Our objective is to examine whether prior health-related employment affects RN workforce supply.

Methods: We estimated a cross-sectional bivariate probit model using the 2008 National Sample Survey of Registered Nurses (NSSRN) (un-weighted/weighted N=21,653/2 million). The two dichotomous dependent variables were (a) working or not working as RN and (b) working full-time or part-time as RN. The key covariates were six dichotomous variables of prior health-related employment before initial RN education: manager, LPN/LVN, allied health, clerk, nursing aide, and all other health-related positions. Other covariates included age, race, highest level of nursing education, full/part-time student, ages of children, other household income, and predicted market RN hourly wage.

Results: The results showed that prior health-related employment in relatively lower wage occupations, such as allied health, clerk, or nursing aide, was positively associated with working as an RN (marginal effect = 0.009-0.027, $p < 0.05 \sim 0.10$; the reference group is RNs without prior health-related employment). It also showed that prior health-related employment in relatively higher wage categories, such as a health care manager or LPN/LVN, was positively associated with working full-time as an RN (marginal effect = 0.039-0.096. $p < 0.01$).

Conclusions: RNs with prior health-related employment were more likely to work as RNs and/or work longer hours than those without such prior experience. Policy implications for stabilizing the long-run RN workforce supply are to promote an expanded career ladder program and a nursing school admission policy that targets non-RN healthcare workers with an interest in becoming RNs.

Title: Effect of prior health-related employment on the registered nurse workforce supply

Introduction

The registered nurse (RN) workforce shortage appears to have been relieved, at least in the short-term, due to economic recession (Buerhaus, 2009). Three likely reasons for this are RNs working hours increased, switching workplaces from long-term care facilities to acute care hospitals, and the return of retired RNs in order to maintain a household income during an economic recession. However, a long-run shortage of the RN workforce supply could occur once the economy recovers (Buerhaus, 2008; Buerhaus, Auerbach, & Staiger, 2009).

Previous research has examined several policies to solve the long-run shortage of RNs. One area of action has been in addressing the RN job turnover rate, which can be improved with high job satisfaction, high group cohesion, and reduced job stress (Shader, Broome, Broome, West, & Nash, 2001). Other approaches focus on factors that affect the employment decisions of current RNs, such as RN wages (Brewer et al., 2006). Finally, the need to expand the number of people entering the RN workforce has been considered. Two approaches that have been proposed are to increase immigration of foreign RNs (Brush, Sochalski, & Berger, 2004), whose proportion was 14% among newly licensed RNs in 2003, and to recruit new RNs from related health care occupations. For example, 14% of all RNs in 2008 had previously been employed as licensed practical nurses or licensed vocational nurses (LPN/LVN) (Cook, Dover, Dickson, & Engh, 2010).

This paper focuses on the extent to which prior non-RN health-related employment among RNs is associated with an increased likelihood of nursing employment and a greater number of hours worked in nursing. A persistent and rapid increase in the proportion of RNs with prior health care employment has been observed, rising from 28.8% in 1992, to 37.3% in 2000, and reaching 67.2% in 2008 (Figure 1) (U.S. Department of Health and Human Services, Health Resources and Services Administration, 1992~2008). The major contributor of this growth is an increase in the number of RNs with prior employment in non-

LPN/LVN occupations. The share of RNs with prior non-LPN/LVN health care employment rose from 20.5% in 1992 to 53.2% in 2008. Despite the growing importance of non-LPN/LVN health-related employment, career ladder programs into RN education are still more readily available for LPNs and LVNs than for other health-related employment categories. To expand career ladder programs to all health-related job categories would be particularly important if RNs with prior health care employment are more likely to work as RNs or to work longer hours than RNs without any prior health care employment. In addition, some RN education programs prefer applicants with prior health care experience (University of Washington, 2013). Such preference among RN schools would be justifiable if empirical evidence indicates that RNs with prior health care experience are more likely to successfully complete RN education, attain nursing skills more readily, and/or remain attached to the labor market.

Our objective is to examine the effect of prior health care employment on RN workforce supply. Brewer and associates analyzed the National Sample Survey of Registered Nurses (NSSRN) 2000 data and found that RNs with prior health care experience were more likely to continue to work as RNs (Brewer et al., 2006). Because the proportion of RNs with prior health care experience has increased since that study was completed and the distribution of prior health care occupations changed, this new analysis may find different effects of prior health care employment on labor force participation.

Our analysis tested the following three hypotheses. First, we hypothesized a positive association between prior health care employment and working as an RN, in part because the wage increase received by these RNs as compared with their prior health care wages may motivate them to continue working as RNs. The other reason we hypothesize there will be greater labor force attachment is that prior health-related work was likely to be supervised by RNs, and thus these nurses had greater exposure to RN work and a more clearly-motivated interest in entering the profession. For the same reasons, our second hypothesis was that there is a positive association between prior health care employment and working longer hours.

Our third hypothesis was that the positive associations of hypotheses 1 and 2 would have greater magnitudes among RNs whose previous health care employment was in a lower wage occupation as compared with a higher wage occupation, because the greater wage increase should have a greater effect on the supply of RN work. To test the third hypothesis, we categorized prior health care employment into two groups, based on average wage level. Figure 2 presents average hourly wages as reported by the U.S. Bureau of Labor Statistics;(U.S. Bureau of Labor Statistics, 2008) our higher wage group (\$19~\$43) included managers and LPNs/LVNs, and the lower wage group (\$12~\$16) included allied health, clerks, and nursing aides.

Methods

Datasets and Study Populations

We analyzed the National Sample Survey of Registered Nurses (NSSRN) from 2008 to test our hypotheses, and also extracted data from the NSSRNs conducted in 1992, 1996, 2000, and 2004 (un-weighted/weighted N=29,800~35,600/2.2~3.1 million per year) (U.S. Department of Health and Human Services, Health Resources and Services Administration, 1992~2008). The NSSRN was a survey of a nationally representative sample of the RN population holding active nursing licenses (Spetz, 2010), and it included questions about education, prior employment, nursing employment, and demographics. We linked the 2008 data with county-level variables from the Area Resource File (ARF) (U.S. Department of Health and Human Services, Health Resources and Services Administration, Bureau of Health Professions, 2011-2012). Our study population excluded male RNs and RNs residing outside the United States. We conducted separate analyses for married females (un-weighted/weighted N=21,513/2,006,419) and unmarried females (un-weighted/weighted N=7,708/709,707), because likelihood ratio tests showed that our regression coefficients were statistically different for male and female RNs ($p<0.001$), and for married and unmarried females ($p<0.001$). All analyses used STATA version 12 (StataCorp., 2011).

Statistical Analyses

We estimated bivariate probit regression equations for two dichotomous dependent variables: whether or not the respondent was employed as an RN, and whether the employed nurse was working full-time (FT) or part-time (PT) (i.e., work intensity). The bivariate probit model was preferred to a simple probit model because the correlation coefficient between the employment equation and the FT/PT equation was statistically significant ($\rho = -0.76$, $p < 0.001$). We also conducted a sensitivity analysis of the FT/PT equation using an additional dependent variable: a dichotomous variable indicating whether the nurse worked more than 40 hours per week.

The bivariate probit equations were estimated with each of two sets of covariates. The common covariates for all regression models included six dichotomous variables indicating prior employment in health-related positions: manager, LPN/LVN, allied health, clerk, nursing aide and all other health-related positions (with "no prior health-related employment" as the excluded category). When an RN reported multiple prior health care occupations, the RN was assigned to the highest-wage occupation. For example, an RN who reported prior employment both as an LPN/LVN and a nursing aide was assigned to the LPN/LVN category. Other variables in the common set were age group (under 30 years, 30-39, 40-49, 50-59, and 60 years or older); a dummy variable to indicate non-white race; highest level of nursing or nursing-related education (diploma, bachelor's degree, or graduate degree, with associate degree as the excluded category); indicators for student status (full-time student or part-time student or not a student, with non-student as the excluded category); indicators for ages of children who live at home (all under 6 years, all 6 years and older, or children in both age groups, with no children as the excluded category); the natural logarithm of other household income (using a midpoint value of the total household income categories) (Brewer et al., 2006); the natural logarithm of predicted market RN hourly wage (described below); county-level unemployment rate; county-level percent of uninsured population; county-level primary care practitioners per 1,000 population; and county-level number of medical, surgical and other specialists per 1,000 population.

The second set of covariates was used only in the regression equation in which FT/PT employment was the dependent variable. These work-intensity covariates were indicators for employment in nursing home or other work setting (with “hospital” as the excluded category). We did not include potentially endogenous work-intensity covariates that have been used in other studies of RN supply, such as job title, holding more than one RN position, and job satisfaction. (Antonazzo, Scott, Skatun, & Elliott, 2003; Brewer et al., 2006)

Following the method by Brewer and colleagues (2006), the predicted market RN hourly wage was calculated for both working and non-working RNs as an instrumental variable for solving endogeneity (Brewer, 1996; Brewer et al., 2006). First, RN hourly wage was calculated for each survey respondent by dividing total earnings from all nursing jobs by the number of annual hours worked for all nursing jobs. Second, we estimated a regression equation in which the dependent variable was the natural logarithm of the constructed wage, and the covariates included non-white race, indicators for region of the U.S., number of years since graduation, indicators for highest nursing or nursing-related education, and number of county-level specialists and primary care doctors per 1,000 population. The estimated coefficients from this equation were used to predict the market wage for both working and non-working RNs.

Results

As shown in Table 1, 83.8 percent of married female RNs were working as RNs in the nationally representative 2008 NSSRN data, and 70.3 percent of these employed RNs worked in full-time positions. The proportion that had prior employment in a high-wage health-related occupation was 14.7 percent, with 13.3 percent having worked as an LPN/LVN and 1.4 percent having worked as a health care manager. More than half previously worked in a lower-wage health occupation, such as nursing aide (35.8%), allied health (9.8%), or clerk (3.1%). Only one-third had no prior health care employment

experience. A higher share of those not employed in an RN position had no prior health-related employment than those employed in an RN position (42.8% vs. 31.0%).

Table 2 summarizes our main regression model results regarding the effect of prior health care employment on RN workforce supply among married female RNs in 2008. Our first hypothesis, that there would be a positive association between prior health care employment and current employment as an RN, was supported; there is a positive association between nursing employment and prior employment for allied health, clerk, and nursing aide. For instance, female married RNs who were previously employed as clerks had 2.7 percentage point higher probability of working as RNs, compared to a reference group of RNs without prior health care employment ($p < 0.05$). The marginal effect for nursing aide and allied health was 0.009 ($p < 0.10$) and 0.021 ($p < 0.05$), respectively. These three prior health care employment categories belong to the lower wage group, and there were not statistically significant associations between working as an RN and the two higher-wage occupations (manager or LPN/LVN). This is consistent with our third hypothesis, that the effect of prior health care employment would be greater for low-wage occupations.

The magnitude of the associations between prior health care employment and the choice of working as an RN appear reasonable when compared to other covariates such as age. For example, compared to RNs with younger than 30 years, RNs aged 30-39 years were 2.3 percentage points less likely to work in nursing. The probability was 3.9 percentage points lower for RNs 40 to 49 years, and 7.2 percentage points lower for RNs 50 to 59 years old.

The results of the regression for full-time versus part-time employment supported our second hypothesis. We measured a positive association between full-time employment and prior health care employment for the two higher-wage job categories (manager and LPN/LVN). Among female married RNs, RNs previously employed as managers had 9.6 percentage point higher probability of working full-

time, compared to a reference group of RNs without prior health care employment ($p < 0.01$). The marginal effect for LPN/LVN was 0.039 ($p < 0.01$). However, these results did not support our third hypothesis because the lower wage group (allied health, clerk, and nursing aide) was not statistically associated with greater work intensity.

Non-nursing household income had a negative association with both whether an RN was working in nursing, and whether the nurse was working full-time. A \$1,000 increase of non-nursing household income lowered the probability of working as RNs by 0.31 percentage point ($p < 0.001$) and the probability of working full-time by 0.04 percentage point ($p < 0.001$).

Discussion

Our study provides empirical evidence that both career ladder programs and preferential nursing school admissions for candidates with prior health employment are justifiable strategies to increase RN workforce supply. RNs with prior LPN/LVN experience were more likely to work full-time than RNs without any prior health care employment. In addition, RNs with prior health care employment were more likely to work as RNs and work longer hours than RNs without any prior health care employment.

Both our first and second hypotheses were empirically supported: RNs with prior health care employment are both more likely to work as RNs and to work longer hours than RNs without any prior health care employment. Although the NSSRN data did not allow us to explore the underlying reasons for these RN workforce supply patterns, one potential reason is that the higher wage of RNs is likely to motivate RNs with prior health care employment to continue working as RNs. Another potential reason is the greater exposure to RN work, because prior health-related work was likely to be supervised by RNs.

We found mixed results regarding our third hypothesis. The regression results indicated that prior employment in lower-wage health occupations (allied health, clerk, and nursing aide) was associated with

employment in nursing, but not with the intensity of work (i.e., full-time versus part-time). In fact, only those with prior experience in higher wage occupations (manager and LPN/LVN) were more likely to work full-time.

The potential reasons for our equivocal findings regarding our third hypothesis are unique for each of the three prior health care employment categories. RNs with manager experience were more likely to work full-time, potentially because they have higher expectations for their annual income. The average hourly wage for health care managers is \$43, whereas that of RNs is \$31. Of course, many RNs with prior experience in health management may have worked in lower-level managerial positions and not earned near \$43; nonetheless, their total target annual income may be higher than that of other RNs and thus they work more hours. It also is possible that our findings with respect to hypothesis three are associated with the demand side of the labor market rather than the supply side. RNs with LPN/LVN experience were more likely to work full-time, possibly because they have an advantage in finding a full-time RN position (due to their past LPN/LVN experiences) (Blegen, Vaughn, & Vojir, 2008). Likewise, managerial experience could help RNs find a full-time RN position as well.

As a first sensitivity analysis, we estimated the same bivariate probit model replacing the full-time equation with a dependent variable measuring whether the RN worked more than 40 hours per week (“over-working”). The results of this sensitivity analysis were qualitatively similar to those presented in Table 2. Among the six prior health care employment categories, the three highest wage categories (managers, LPN/LVN, and allied health) and the nursing aide category were positively associated with longer working hours. Thus, in the sensitivity analysis the second hypothesis was supported but the third hypothesis was not; this is similar to our primary results.

The face validity of our primary analysis is indicated by comparing our key covariates with previous research by Brewer et al. (Brewer et al., 2006). Although our definitions of prior health care

employment differed from their study, their results were consistent with ours in terms of the sign, the statistical significance level and the magnitude of the estimated prior health care employment coefficients.

Limitations

This paper has three main limitations. First, because the NSSRN is a cross-sectional survey, we can measure only associations between labor supply and RN characteristics. As discussed above, it is possible that our results are driven by the demand side of the labor market rather than the employment decisions made by RNs. Second, our data precede the economic recession that commenced in December 2007; employment patterns of RNs may have changed since 2008 due to changes in both the supply of and demand for RNs (Buerhaus, 2008, 2009). Future work should explore whether the employment patterns measured in this analysis have persisted. Unfortunately, such analysis requires access to data with which you can measure the employment status of licensed nurses, and other data sources such as the American Community Survey and Current Population Survey do not permit this (Spetz, 2013). Finally, our sensitivity analysis in which the bivariate probit model was estimated for unmarried female RNs did not support our hypotheses, i.e., no statistically significant association between prior health care employment and either employment or full-time employment. This result suggests that the employment patterns of unmarried RNs may be fundamentally different from those of married RNs. Since 74 percent of RNs are married, their employment patterns are particularly important in determining the overall supply of RN labor.

Policy Implications

Our results provide support for career ladder strategies to support non-RN healthcare workers in the pursuit of RN education. These programs can be expanded by offering more scholarship opportunities and flexible work schedules for LPN/LVNs enrolled in these ladder-programs (Cook et al., 2010; Seago, Spetz, Chapman, & Dyer, 2006). Our empirical results also indicate that career ladder programs for non-LPN/LVN healthcare workers also could be beneficial to increasing RN labor supply; a growing share of

RNs have prior work experience in these other health occupations (Figure 1) (Brown Jr, Sale, Director, & Clendenin, 2011; Wilkes & Bartley, 2010).

Our empirical results also justify RN education programs' preference for applicants with prior health care employment. Increasing the proportion of RNs with prior health care employment may help to reduce the turnover rate in healthcare facilities and ultimately stabilize the RN workforce supply in the long-run.

Conclusions

From the viewpoint of stabilizing the RN workforce supply, our empirical results welcome the rapid increase in the proportion of RNs with prior health care employment – particularly non-LPN/LVN employment – among RNs. This is because RNs with prior health care employment were found to be more likely to work as an RN and to work longer hours. Continued expansion of career ladder programs for both LPN/LVN and non-LPN/LVN healthcare workers and school admission policies that show preference to applicants with prior health care employment can help to provide long-term stability to RN labor supply.

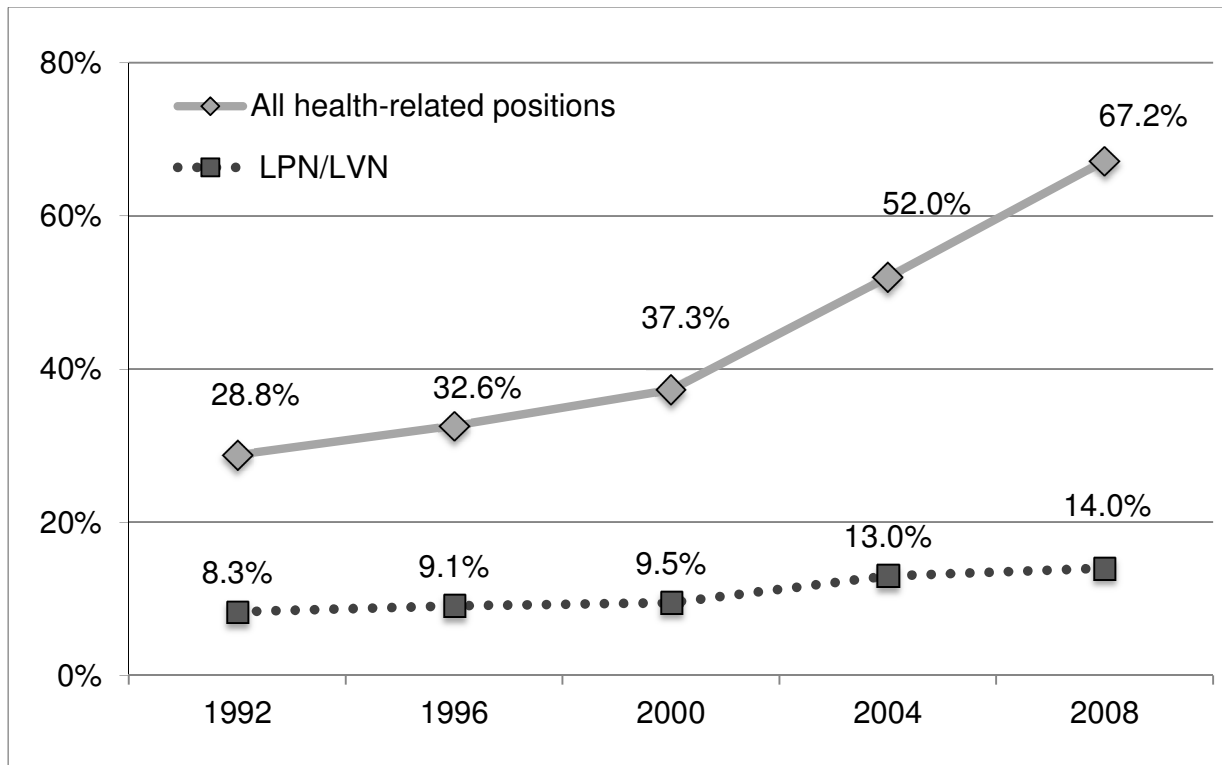


Figure 1. Proportion of Registered Nurses (RN) in a health-related employment prior to initial RN education, 1992-2008

Source: U.S. Department of Health and Human Services, Health Resources and Services Administration, National Sample Survey of Registered Nurses (1992~2008)
 LPN/LVN: Licensed Practical Nurse / Licensed Vocational Nurse

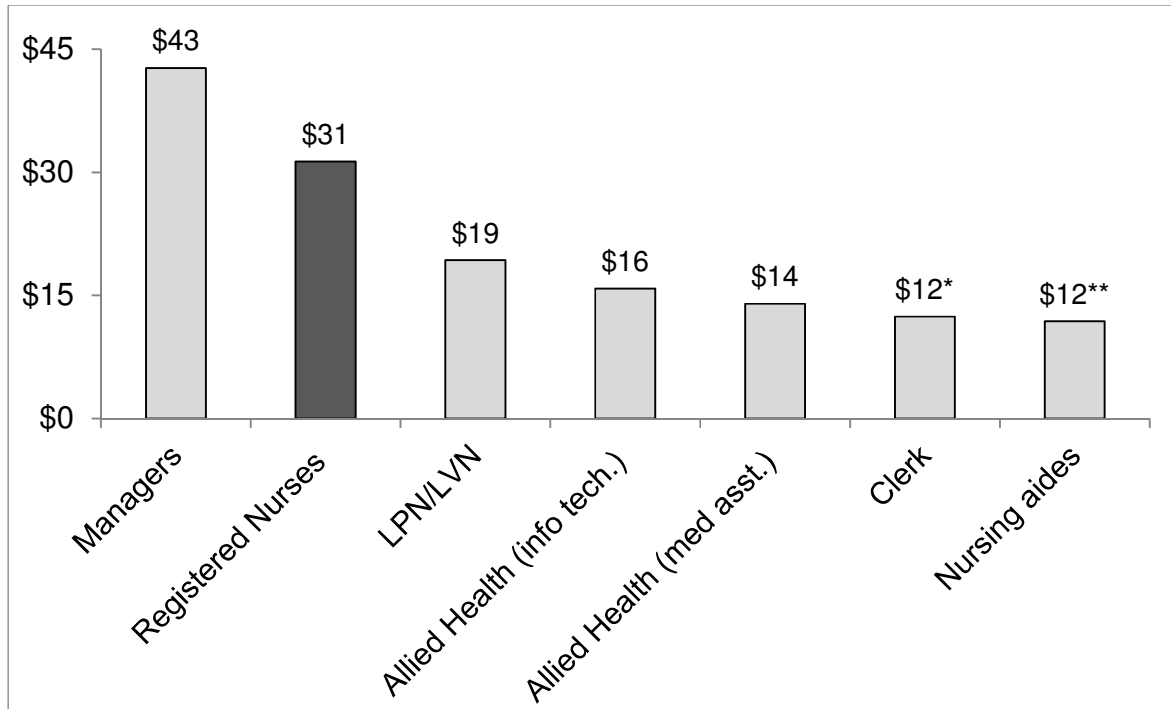


Figure 2. Hourly wage[§] mean in health sector, 2008

LPN/LVN: Licensed Practical Nurse / Licensed Vocational Nurse

Source: U.S. Bureau of Labor Statistics, May 2008 National Occupational Employment and Wage Estimates (U.S. Bureau of Labor Statistics, 2008)

[§] Rounding to a discrete number

* Rounding from \$12.42

** Rounding from \$11.84

Table 1: Demographic and Work Characteristics of Married Female Registered Nurses (RN): Working or Not Working as RNs (WK/NK), and Full-time or Part-time Working as RNs (FT/PT), in 2008 (N = Weighted/Un-weighted Sample Size)

Outcome variable	Working as RNs or Not			Full-time or Part-time RN employment		
	Married Female			Married Female		
	Total	Working in nursing	Not working in nursing	Total	Full-Time	Part-Time
	N=2,006,419 /21,513	N=1,681,862 /18,337	N=324,557 /3,176	N=1,681,862 /18,337	N=1,182,868 /12,927	N=498,994 /5,410
I. Outcome variables	Weighted %	Weighted %	Weighted %	Weighted %	Weighted %	Weighted %
Working or Not as RNs (WK/NK)						
Working as RNs	83.8			N/A		
Not working as RNs	16.2					
Full-time or Part-time working as RNs (FT/PT)						
Full-time working	N/A	N/A	N/A	70.3	N/A	N/A
Part-time working				29.7		
II. Categorical variables	Weighted %	Weighted %	Weighted %	Weighted %	Weighted %	Weighted %
Past health related job (category-4)						
Manager	1.4	1.4	1.6	1.4	1.6	0.9
LPN/LVN ^a	13.3	13.9	10.3	13.9	15.5	10.3
Allied health	9.8	10.2	7.4	10.2	10.1	10.6
Clerk	3.1	3.3	2.3	3.3	3.3	3.4
Nursing aide	35.8	36.6	31.7	36.6	35.8	38.4
Other	3.6	3.6	3.8	3.6	3.6	3.4
No past health related job	33.0	31.0	42.8	31.0	30.2	33.1
Log other income						
Log other income = 0	5.1	6.1	0.0	6.1	7.5	2.9
Log other income > 0	94.9	93.9	100.0	93.9	92.5	97.1
Age						
<30	7.9	9.0	2.1	9.0	9.7	7.2
30-39	20.9	22.4	13.0	22.4	22.2	22.7
40-49	27.3	29.0	18.5	29.0	29.2	28.7
50-59	29.7	30.3	26.9	30.3	31.8	26.5

>=60	14.3	9.4	39.4	9.4	7.1	15.0
Race						
White	85.2	84.3	90.0	84.3	81.4	91.0
Other	14.8	15.7	10.0	15.7	18.6	9.0
Highest nursing education						
Diploma	14.8	13.1	23.7	13.1	11.7	16.3
Associate degree	35.6	37.1	27.5	37.1	39.0	32.5
Bachelor	36.7	37.1	34.8	37.1	35.5	40.8
Masters	13.0	12.8	13.9	12.8	13.8	10.4
Full/part-time student						
Not student	92.6	92.0	96.2	92.0	91.1	94.0
Full-time student	2.6	2.7	1.7	2.7	3.0	2.2
Part-time student	4.8	5.3	2.1	5.3	6.0	3.8
Ages of children who live at home						
No children at home	51.5	48.8	65.5	48.8	51.3	43.0
All < 6 years old	11.0	11.7	7.7	11.7	10.3	14.8
All 6 years or older	29.6	31.4	20.4	31.4	30.8	32.9
Some <6, some >6	7.8	8.1	6.4	8.1	7.6	9.4
Work setting						
Hospital				60.2	59.9	61.0
Nursing home	N/A	N/A	N/A	5.2	5.8	3.9
Other				34.6	34.4	35.1
III. Continuous variables						
	Mean (Std. Err.)	Mean (Std. Err.)	Mean (Std. Err.)	Mean (Std. Err.)	Mean (Std. Err.)	Mean (Std. Err.)
Predicted log market hourly RN wage^b	3.37 (0.001)	3.37 (0.001)	3.39 (0.003)	3.37 (0.001)	3.36 (0.002)	3.38 (0.002)
Medical, surgical and other specialists per 1,000 population	1.12 (0.007)	1.14 (0.008)	0.99 (0.016)	1.14 (0.008)	1.13 (0.010)	1.16 (0.013)
Primary care practitioners per 1,000 population	0.32 (0.001)	0.32 (0.001)	0.30 (0.003)	0.32 (0.001)	0.31 (0.001)	0.33 (0.002)
Percent uninsured population	14.1 (0.025)	14.1 (0.028)	14.3 (0.100)	14.1 (0.028)	14.4 (0.038)	13.4 (0.056)
Unemployment rate	5.71 (0.011)	5.71 (0.112)	5.68 (0.028)	5.71 (0.012)	5.73 (0.016)	5.67 (0.023)

IV. Other variables in predicted RN wage model	Weighted %	Weighted %	Weighted %	Weighted %	Weighted %	Weighted %
Years since graduation						
≤5 years	14.6	16.6	4.1	16.6	18.9	11.4
6-10 years	12.6	13.6	7.5	13.6	13.7	13.4
11-15 years	14.7	15.6	9.9	15.6	16.0	14.6
16-20 years	10.5	10.9	8.6	10.9	10.7	11.3
21-25 years	12.7	12.8	12.4	12.8	12.5	13.5
≥26 years	34.9	30.6	57.4	30.6	28.4	35.9
Region of employment or residence^c						
New England	6.2	6.3	5.3	6.3	5.6	7.9
Middle Atlantic	15.0	14.6	17.4	14.6	14.3	15.2
East North Central	17.4	17.5	17.3	17.5	16.3	20.2
West North Central	8.7	9.2	6.5	9.2	8.6	10.5
South Atlantic	18.7	18.2	21.1	18.2	20.1	13.9
East South Central	6.7	7.0	5.2	7.0	7.6	5.4
West South Central	9.0	9.0	8.7	9.0	10.5	5.5
Mountain	5.9	6.0	5.4	6.0	5.9	6.2
Pacific	12.4	12.3	13.0	12.3	11.0	15.3

^a LPN/LVN: Licensed Practical Nurse / Licensed Vocational Nurse

^b Working RNs in the dataset was used to estimate a regression model of the market hourly wage. The response, RN hourly wage, was calculated by adding salaries from all nursing jobs, then dividing by the number of annual hours worked for all nursing jobs. The natural logarithm of the wage was used to make the distribution approximately normal. The estimated coefficients in the RN hourly wage regression model were used to predict the market wage for both working and nonworking RNs.

^c When the RN was employed in nursing in 2008, at the time of the survey, the census division of employment in the principal nursing position was recorded. When the RN was not employed in nursing in 2008, at the time of the survey, the census division of residence was recorded.

Table 2: Bivariate Probit Regression Results for Married Female RNs: Dependent Variables (Working/Non-working and Full-time/Part-time), in 2008 (N = Weighted/Un-weighted Sample Size)

Outcome variable	Working as RNs or Not			Full-time or Part-time RN employment		
	Married female			Married female		
	Weighted N = 2,006,419			Weighted N = 2,006,419		
	Un-weighted N = 21,513			Un-weighted N = 21,513		
Explanatory variable (Reference category in parentheses)	Coefficient	P> t	Marginal Effect ^b	Coefficient	P> t	Marginal Effect ^b
Past health related job (no past health related job)						
Manager	-0.031	0.764	-0.005	0.359	0.001***	0.096
LPN/LVN ^a	0.055	0.281	0.009	0.134	0.002***	0.039
Allied health	0.139	0.011**	0.021	-0.041	0.375	-0.013
Clerk	0.177	0.043**	0.027	-0.046	0.543	-0.014
Nursing aide	0.055	0.086*	0.009	0.003	0.921	0.001
Other	-0.195	0.024**	-0.034	0.044	0.512	0.013
Predicted log market hourly wage	-0.031	0.854	-0.005	-1.559	0.001***	-0.464
Log non-nursing household income^c	-0.872	0.001***	-0.137	-0.065	0.001***	-0.019
Age (<30)						
30-39	-0.213	0.026**	-0.023	-0.038	0.492	-0.011
40-49	-0.332	0.001***	-0.039	-0.088	0.132	-0.025
50-59	-0.542	0.001***	-0.072	-0.118	0.049**	-0.034
>=60	-1.594	0.001***	-0.326	-0.421	0.001***	-0.132
Medical, surgical and other specialists per 1,000 population	0.163	0.001***	0.026	0.099	0.001***	0.029
Primary care practitioners per 1,000 population	0.061	0.550	0.010	-0.637	0.001***	-0.190
Percent uninsured population	-0.006	0.086*	-0.001	0.029	0.001***	0.009
Unemployment rate	0.017	0.079*	0.003	0.006	0.442	0.002
Race - Other (white)	0.007	0.895	0.001	0.458	0.001***	0.122
Highest RN/RN-related education (associate)						
Diploma	-0.078	0.101	-0.013	-0.067	0.101	-0.021
Bachelors	0.017	0.655	0.003	-0.001	0.986	0.000
Masters	0.185	0.001***	0.027	0.535	0.001***	0.137
FT/PT student (full-time student)						
Part-time student	-0.024	0.786	-0.004	0.074	0.362	0.022

Not student	0.376	0.001***	0.050	0.175	0.003***	0.050
Children at home (no children at home)						
All <6 years	-0.252	0.001***	-0.042	-0.615	0.001***	-0.193
All >6 years	0.027	0.506	0.004	-0.313	0.001***	-0.090
Some <6, some >6	-0.319	0.001***	-0.055	-0.520	0.001***	-0.159
Work setting (Hospital)						
Nursing home				0.251	0.001***	0.071
Other		N/A		0.097	0.001***	0.029
Constant	11.049	0.001***		6.370	0.001***	
Rho	-0.760	0.001***				

Note. * $P < 0.1$, ** $P < 0.05$, *** $P < 0.01$

^a LPN/LVN: Licensed Practical Nurse / Licensed Vocational Nurse

^b Marginal effects indicate the percentage point change in probability of working for category variables. For instance, RNs with prior clerk employment (Marginal effect=0.027) has 2.7% point higher probability of working as RNs, compared with RNs without any prior healthcare employment. The predicted/crude probabilities of working as RNs were 0.871/0.791 (reference group), 0.892/0.878 (prior allied health employment), 0.897/0.881 (prior clerk employment) and 0.879/0.857 (prior nursing aide employment). The predicted/crude probabilities of full-time working as RNs were 0.743/0.684 (reference group), 0.838/0.820 (prior manager employment) and 0.781/0.782 (prior LPN/LVN employment).

^c Marginal effects of log of other household income can be interpreted in terms of \$1,000 change of other household income. For instance, \$1,000 increase of other household income lowers the probability of working as RNs by 0.31% point (Marginal effect=0.137).

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