# Variation in academic preparation and progression of nurses across the continuum of care

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## ARTICLE INFO

## ABSTRACT

*Background:* Changing health care needs are driving new models of care that emphasize care coordination, health promotion, and disease management by registered nurses (RNs). A skill-mix favoring professional (baccalaureate or above) over technical (less than baccalaureate) education is promoted by national initiatives.

*Purpose:* To examine the academic preparation and progression of general practice RNs in practice settings across the care continuum.

*Method:* Secondary analyses of data from the Texas Board of Nurses RN Licensure databases in 2008 and 2014.

*Findings:* Overall the professional skill-mix for general practice RNs improved from 47.1% to 50.2%. Disparities were identified in home health (31.6%), long-term care (27.8%) and nonmetropolitan areas (31.7%). Role change was the strongest correlate of academic progression.

*Discussion:* Non-hospital and rural practice settings may be vulnerable to the effects of an undereducated RN workforce. More effective reimbursement policies and employer incentives are needed to drive academic progression and address disparities across practice settings.

Controversy over the appropriate educational preparation of registered nurses (RNs) for entry to practice is not new and continues to serve as a divisive issue among nurses. Professional education is acquired through completion of undergraduate (baccalaureate) or graduate (master's and doctoral) level degrees from colleges and universities whereas technical education is acquired through completion of an associate degree from vocational schools/community colleges or a diploma from hospital-based programs (Nelson, 2002). The merits of these two levels of education have been debated for decades without resolution or consensus. Multiple policy initiatives to establish professional education as a minimum requirement for RN licensure have failed (Donley & Flaherty, 2008). Consequently, the US is one of few industrialized countries that accept a technical education for entry to RN practice (Conner & Thielman, 2013). Currently, graduates of

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professional and technical nursing programs take the same licensure exam, share the title of RN, and can be hired interchangeably within general practice roles across all practice settings based on employer discretion. Two notable exceptions include the uniformed services and the state of North Dakota. The policies establishing the baccalaureate degree as a requirement for entry to practice for active duty nurses in the uniformed services, and for all new RNs in North Dakota, were established in 1976 and 1986 respectively (George & Young, 1990; Schoneboom & Hopkins-Chadwick, 2014).

The policy debate over educational requirements for RNs is contextualized by the practice environment, health care policy, and research findings. Changes within these areas serve as catalysts to renew and reshape the debate. The emerging trends described in this paper strengthen the argument favoring professional education for RNs across the care continuum and stimulated voluntary-based academic progression initiatives among the nursing workforce. In response to these trends, we conducted a study to further inform the policy debate about the educational requirements for RNs across the care continuum. The specific aims were twofold: to examine the academic preparation of RNs in general practice roles across the care continuum before and after voluntary-based academic progression initiatives; and to assess variation in academic progression among general practice RNs following voluntary-based academic progression initiatives.

## Evolving Health Care Needs and Delivery Systems

An increase in the aging population and the chronic disease burden across the lifespan has altered health care service demand patterns (US Department of Health and Human Services [USDHHS], 2017; Ward, Schiller, & Goodman, 2014; Wu & Green, 2000). A growing number of patients now require services from multiple providers across multiple practice settings. Significant coordination is required to provide care that is continuous rather than fragmented (Pruitt & Epping-Jordan, 2005), and emphasis on health promotion is needed to reverse the chronic disease burden among future generations. This demand pattern does not fit with the current episodic disease-oriented delivery model focused on acute care settings. Consequently, new care models, often prompted by health policy initiatives such as the Affordable Care Act, are emerging (Shortell et al., 2015).

Emerging delivery models have common themes emphasizing multidisciplinary team-based care, chronic disease management within primary care settings, and increased patient engagement (Bauer & Bodenheimer, 2017; Naylor, Shaid, Carpenter, Gass, & Levine, et al., 2017). More direct care is shifted to community-based practice settings and patients' homes.

Hospitals are no longer the hub of the health care system; rather, hospitals are reserved for the most acutely ill patients who require highly technical and specialized care. Patient acuity at the time of hospital discharge often remains high, and follow-up care by teams of multidisciplinary specialists is needed. Therefore, RNs across all practice settings must be prepared to care for high-acuity and high-complexity patients. Community-based primary care providers emerge as the new hub of the system, coordinating referrals for services across the health care continuum.

## Evolving Practice Roles

Emerging demand patterns and models of care require changes in practice across the care continuum. Pioneer accountable care organizations reported the emergence of new and/or expanded roles for RNs as well as increased use of RNs in traditional roles (Pittman & Forest, 2015). Practice changes included: enhanced roles in primary care; substitution of RNs for other providers to manage selected acute care conditions in primary care settings; increased delegation to less-educated providers; increased care coordination responsibilities; transfer of nursing services from hospitals to primary care and from skilled nursing facilities to home care; and the relocation of nurses from hospitals to primary care clinics. These findings are consistent with other studies of primary and postacute care settings (Freund et al., 2015; Norful, Martsolf, de Jacq, & Poghosyan, 2017; Smolowitz et al., 2015). Bauer and Bodenheimer (2017) concluding that the roles and responsibilities for RNs in primary and postacute care will continue to expand. RNs will play a central role in the following areas: protocol-based chronic disease management, leading complex care management teams, and coordinating care between primary care practices and surrounding medical neighborhoods.

RNs must now be prepared to provide episodic and preventive care to increasingly complex patients in all settings and to assume a central role in population health, care coordination, chronic disease management, and leadership of multidisciplinary teams and practice operations (Bauer & Bodenheimer, 2017; Borkan, Eaton, Novillo-Ortiz, Corte, & Jadad, 2010; Smolowitz et al., 2015). The knowledge and skill required to support these practice changes are best acquired through professional, rather than technical education (Clarke, 2016; Conner & Thielman, 2013). However, RNs with a technical education have been the dominate sector in the RN workforce (Conner & Thielman, 2013; Donley & Flaherty, 2008) and there is a growing consensus that the RN workforce is generally undereducated in relation to evolving expectations (Bauer & Bodenheimer, 2017).

## Nursing Education and Patient Outcomes

Emerging evidence links professional nursing education with better patient outcomes. Specifically, the professional RN skill-mix of hospitals is associated with lower 30-day mortality, shorter lengths of stay, and lower failure to rescue rates (Aiken et al., 2011; Aiken, Clarke, Cheung, Sloane, & Silber, 2003; Aiken et al., 2014; Cho, Park, Choi, Lee, & Kim, 2018; Cho, Sloane, Kim, Kim, & Choi, 2015; Estabrooks, Midodzi, Cummings, Ricker, & Giovannetti, 2005; Friese, Lake, Aiken, Silber, & Sochalski, 2008). Moreover, hospitalized patients receiving higher proportions of care from professionally educated RNs have lower costs, shorter lengths of stay, and lower mortality rates (Yakusheva, Lindrooth, & Weiss, 2014a; Yakusheva, Lindrooth, & Weiss, 2014b). This *education effect* suggests that patients receiving care in practice settings with lower proportions of professionally educated nurses may be disproportionately vulnerable to negative outcomes. Acceptance of professional RN skill-mix as a quality metric appears highest in the hospital practice setting. Magnet designated and Magnet seeking hospitals are required to track performance on the professional RN skill-mix metric over time and demonstrate progress toward a target of 80% (Graystone, 2018; Winokur, Rutledge, & Hayes, 2016). Notably, a higher mean professional RN skill mix in Magnet designated hospitals (43%) compared to non-Magnet hospitals (38%) was reported in one multi-state study (Kelly, McHugh, & Aiken, 2011). Disparate attention to the professional RN skill-mix metric across practice settings may result in an unequal distribution of highly educated RNs. Serendipitous findings from national and state RN survey data provided limited evidence for variation between hospital and non-hospital settings. A review of national cross-sectional survey findings from 2001 to 2015 indicate that the professional RN skill-mix increased in inpatient settings and decreased in non-hospital settings (TDSHS, 2016). In a 2014 survey of Kansas RNs, a higher proportion of baccalaureate-prepared RNs worked in hospitals, whereas, a higher proportion of associate degree RNs worked in long term care (Shen, Peltzer, Teel, & Pierce, 2015).

## The Academic Progression in Nursing (APIN) Initiative

The Institute of Medicine's (IOM) report on the future of nursing (IOM, 2011) promotes academic progression within the RN workforce to reverse the current skill-mix and favor professional education. The IOM's goal is to achieve a skill-mix with 80% of the RN workforce educated at or above the baccalaureate level by 2020. In contrast to previous campaigns that focused on state legislation to mandate the baccalaureate degree as an entry level requirement (Conner & Thielman, 2013), the IOM report emphasizes higher education reform and employer human resource policies to promote voluntary academic progression.

In 2012, the Robert Wood Johnson Foundation sponsored the Academic Progression in Nursing (APIN) initiative to fund the work of 9 state action coalitions to pursue the IOM's goal (Campaign for Action, 2018; Gerardi, 2014, 2015). APIN emphasized specific education models designed to remove barriers to academic progression: baccalaureate degrees conferred by approved community colleges; outcomes-based curricula; accelerated options (RN to Master's of Science in Nursing (MSN)); shared curricula across regions and types of entry-level programs (Reid, Tart, Tietze, Joseph, & Easley, 2017). Recommended employer-based incentives include: tuition reimbursement, requirements for achieving a professional degree within 5 years of hire, salary differentials for higher education, and linking professional education to eligibility for promotions (IOM, 2011; Pittman, Herrera, Horton, Thompson, Ware, & Terry, 2013). Notably, the IOM's goal offers no consideration for RN skill-mix across the care continuum, and the APIN strategies are likewise broad in scope and context independent (Gerardi, 2015). Consequently, the effectiveness of this campaign is unlikely to be uniform across practice settings. Significant variation based on employer and regional higher education practices is likely but has not been adequately examined.

Multiple national and state reports have been released to track progress toward the IOM goal. Prior to the APIN initiative (2010), the proportion of employed RNs with a baccalaureate education was estimated at 49% nationally; the most recent (2016) national estimates range from 54% to 62% (AMN Healthcare, 2015; Buerhaus, Skinner, Auerbach, & Staiger, 2017; Campaign for Action, 2018). State-level estimates include: 52.1% (2013) to 57.5% (2016) in Texas (Texas Department of State Health Services [TDSHS], 2013, 2016); 60.6% (2014) in Kansas (Shen et al., 2015); and 58.0% (2015) to 52.8% (2017) in Michigan (Michigan Center for Nursing, 2015). These estimates were based on aggregate samples of RNs across all levels of practice and practice settings; sub-group estimates by level of practice and/or practice setting were not consistently reported. RNs in many positions (e.g., managers, administrators, staff development educators, faculty, and researchers) have little direct patient contact. Inclusion of RNs in these positions overestimates the exposure of patients to professionally educated RNs during the delivery of care. Trends related to care demands and new delivery models support the need for professionally educated RNs across the care continuum. However, there is a gap in knowledge regarding academic progression and distribution of professional RNs across practice settings. Such knowledge is needed to assess variations of the impact of APIN and identify practice settings that might be particularly vulnerable to the effects of undereducated RNs. Once identified,

policies targeting RNs and/or employers in these areas can be developed and implemented.

## Methods

Secondary analyses of data collected by the Texas Board of Nurses (TBON) during the RN license application and renewal processes in 2008 and 2014 were completed. Texas was one of the states with an action coalition and targeted interventions to promote academic progression (Gerardi, 2014, 2015) and the TBON maintains a robust RN dataset. Applicants for an RN licensure in Texas complete an online survey with inquiries related to personal demographics, education, and employment. Applicants for RN license renewal repeat this survey process biannually. We acquired TBON RN data in 2008 and 2014 to capture relevant data before and after initiation of voluntary-based academic progression initiatives endorsed by the IOM Future of Nursing report and APIN. The data files were merged to support two types of analyses related to academic preparation. Study aim 1 focused on academic progression of RNs. Study aim 2 focused on a cross-sectional comparison of academic preparation between all general practice RNs before (2008) and after APIN (2014) and an analysis of factors associated with academic progression in the cohort of general practice RNs in 2008 (before APIN) who were still practicing in Texas in 2014 (after APIN). We included RNs with an active Texas RN license, current residence and employment as an RN in Texas, and complete data for the basic and highest academic preparation fields.

A total of 14 study variables were included. The seven demographic variables included: gender, race/ethnicity, age, generation (based on year of birth: traditionalists < 1945; baby boomers 1946−1964; generation X 1965−1980; and millennials 1981−2000), nursing experience (years computed from reported graduation date), Texas region, and location. Region and location variables were generated by mapping the address data fields against established parameters for eight public health regions, metropolitan/urban status, and non-metropolitan/rural status. The four employment variables included practice setting, position, role, and role change. Practice setting was reduced to five categories: inpatient (hospital inpatient, military installation, and staffing agency); ambulatory (hospital outpatient, public health, school health, self-employment/private practice, doctor/dentist office, rural health clinic, and freestanding clinic); home health; long term care; and other/non-clinical (school of nursing and business/industry). The position variable was recoded to create the role variable: general practice (staff nurse, school nurse, and office nurse); advanced practice management (head nurse, supervisor, and administrator, and consultant); advanced practice educator/researcher (faculty, researcher, and staff development coordinator); and advanced practiced clinical (nurse practitioner,

certified nurse anesthetist, clinical nurse specialist, and certified nurse midwife). The role change variable was created for the cohort of general practice RNs in 2008 still employed in 2014. Role change was defined as movement into any one of the advanced practice roles by 2014.

The three education variables included basic academic preparation (highest degree upon entry to practice), highest academic preparation (highest degree at the time of licensure/renewal survey), and academic progression. Basic and highest academic preparation responses were collapsed into two categories: technical (<Baccalaureate) and professional (≥Baccalaureate). In the cohort of general practice RNs in 2008 still practicing in 2014, academic progression was credited to RNs reporting a technical level of highest academic preparation in 2008 and a professional level of highest academic preparation in 2014. Associations between academic progression and the remaining 13 study variables were examined in this cohort using a logistic regression model. Analyses were completed using IBM SPSS v 24.

## Findings

The cohorts of eligible general practice RNs for descriptive cross-sectional comparisons in 2008 and 2014 included 166,825 and 205,884 RNs respectively. Among the general practice RNs in 2008, 57% ($n = 94,648$) were still employed in Texas in 2014 and were included in the regression analysis.

### Demographic Characteristics of General Practice RNs

Demographic characteristics of the general practice nurses are presented in Table 1. Consistent across both time periods, the general practice RNs were primarily female (90%−89%), Caucasian (69%−66%), living in metropolitan areas (88%−91%), practicing in inpatient settings (65%), and staff nurse positions (79%−81%). The 2008 and 2014 cohorts were similar in age (45.16 and 45.27 years) and experience level (16.31 and 16.59 years). In 2008, most general staff RNs were baby boomers (49.1%) and traditionalists (6.0%) and by 2014 the majority were generation Xer's (40.4%) and millennials (21.3%). Across both time periods, the largest proportion of general practice RNs resided in either North Texas (29.6% to 29.2%) or the Gulf Coast (26.9%).

### Academic Preparation of General Practice RNs
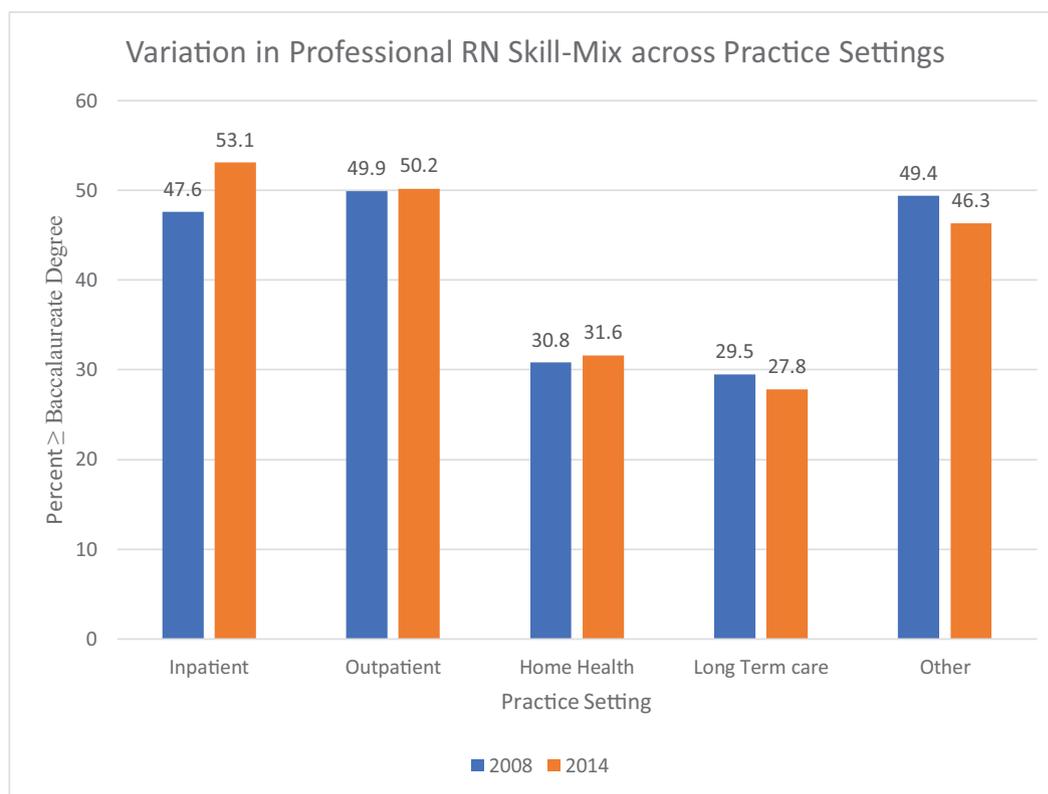
Most general practice RNs were initially prepared as technical nurses; however, there was a 5% decline in this proportion between 2008 (65.3%) and 2014 (61.8%). In 2008, less than half (47.1%) of the general practice RNs had attained a professional degree. This proportion increased by 6.6% in the 2014 cohort with approximately half (50.2%) of the general practice RN workforce

## Table 1 – Characteristics of Texas Registered Nurses in General Practice Roles

| Characteristic | | 2008 N = 121,457 | 2014 N = 151,689 |
|---|---|---|---|
| Gender n (%) | Female | 109,733 (90.3) | 135,185 (89.1) |
| | Male | 11,724 (9.7) | 16,503 (10.9) |
| Race/ethnicity n (%) | Caucasian | 83,528 (68.8) | 100,719 (66.4) |
| | African American | 10,099 (8.3) | 14,996 (9.9) |
| | American Indian | 420 (0.3) | 500 (0.3) |
| | Asian | 12,519 (10.3) | 14,608 (9.6) |
| | Hispanic | 12,438 (10.3) | 13,771 (9.1) |
| | Other | 2453 (2.0) | 7094 (4.7) |
| | Missing | 0 (0.0) | 1 (<0.1) |
| Age Mean (SD) | Years | 45.16 (11.43) | 45.27 (12.30) |
| Generation n (%) | Traditionalist | 7260 (6.0) | 3220 (2.1) |
| | Baby Boomer | 59,621 (49.1) | 54,993 (36.3) |
| | Generation X | 47,687 (39.3) | 61,228 (40.4) |
| | Millennials | 6889 (5.7) | 32,248 (21.3) |
| Geographic region n (%) | Panhandle | 5349 (4.4) | 5985 (3.9) |
| | North Texas | 35,966 (29.6) | 44,259 (29.2) |
| | East Texas | 8061 (6.6) | 9622 (6.3) |
| | Central Texas | 12,743 (10.5) | 17,606 (11.6) |
| | Gulf Coast | 32,673 (26.9) | 40,852 (26.9) |
| | South Texas | 17,090 (14.1) | 16,576 (10.9) |
| | Rio Grande valley | 6959 (5.7) | 9624 (6.3) |
| | West Texas | 2616 (2.2) | 6995 (4.6) |
| | Missing | 0 (0.0) | 170 (0.1) |
| Location n (%) | Urban | 107,166 (88.2) | 138,522 (91.3) |
| | Rural | 14,1457 (11.8) | 12,997 (8.6) |
| | Missing | 0 (0.0) | 170 (0.1) |
| Nursing experience mean (SD) | Years | 16.31 (11.67) | 16.59 (12.03) |
| Practice setting n (%) | Inpatient | 79,221 (65.4) | 98,964 (65.2) |
| | Outpatient | 21,588 (17.8) | 25,949 (17.1) |
| | Home health | 6069 (5.0) | 8980 (5.9) |
| | Long-term care | 1869 (1.5) | 2855 (1.9) |
| | Non-Clinical/Other | 12,415 (10.2) | 14,941 (9.8) |
| | Missing | 295 (0.2) | 0 (0.0) |
| Role n (%) | Staff nurse | 95,836 (78.9) | 123,013 (81.1) |
| | School nurse | 5689 (4.7) | 5903 (3.9) |
| | Office nurse | 3966 (3.3) | 4015 (2.6) |
| | Other | 15,966 (13.1) | 18,758 (12.4) |
| Basic academic preparation n (%) | < Baccalaureate | 79,259 (65.3) | 93,727 (61.8) |
| | Baccalaureate | 42,061 (34.6) | 57,706 (38.0) |
| | Master | 137 (0.1) | 256 (0.2) |
| Highest academic preparation n (%) | < Baccalaureate | 64,283 (52.9) | 75,574 (49.8) |
| | Baccalaureate | 52,695 (43.4) | 71,645 (47.2) |
| | Master | 4157 (3.4) | 4380 (2.9) |
| | Doctoral | 322 (0.3) | 90 (0.1) |

## Table 2 – Academic Preparation of Nurses in General Practice Across the Continuum of Care

| | Practice setting | | | | |
|---|---|---|---|---|---|
| Highest degree | Inpatient | Outpatient | Home health | Long-term care | Non-Clinical/Other |
| **2008 N (%)** | 79,221 | 21,588 | 6069 | 1869 | 12,415 |
| < Baccalaureate | 41,521 (52.4) | 10,806 (50.1) | 4202 (69.2) | 1318 (70.5) | 6285 (50.6) |
| Baccalaureate | 35,476 (44.8) | 9792 (45.4) | 1704 (28.1) | 489 (26.2) | 5105 (41.1) |
| Master's | 2091 (2.6) | 937 (4.3) | 153 (2.5) | 58 (3.1) | 905 (7.3) |
| Doctoral | 133 (0.2) | 53 (0.2) | 10 (0.2) | 4 (0.2) | 120 (1.0) |
| **2014 N (%)** | 98,964 | 25,949 | 8980 | 2855 | 14,941 |
| < Baccalaureate | 46,423 (46.9) | 12,917 (49.8) | 6146 (68.4) | 2061 (72.2) | 8027 (53.7) |
| Baccalaureate | 49,880 (50.4) | 12,125 (46.7) | 2691 (30.0) | 740 (25.9) | 6209 (41.6) |
| Master's | 2620 (2.6) | 890 (3.4) | 143 (1.6) | 52 (1.8) | 675 (4.5) |
| Doctoral | 41 (<0.1) | 17 (0.1) | 0 (0.0) | 2 (0.1) | 30 (0.2) |

**Figure 1 – Variation in Texas RN Skill-Mix across practice settings.**

educated as professional nurses (Table 1). In 2008, across all practice settings most general practice RNs were educated as technical nurses (Table 2); however, the settings with the highest proportion of technical nurses were home health (69.2%) and long-term care (70.5%). By 2014, most general practice RNs in the inpatient and outpatient settings were educated as professional nurses (53.0% and 50.2% respectively; Figure 1). However, most general practice RNs in home health and long-term care were educated at the technical level (68.4% and 72.2% respectively). The inpatient setting experienced the largest increase (11.6%) in professionally educated general practice RNs between 2008 (47.6%) and 2014 (53.1%). The gap between the proportion of professionally educated RNs in inpatient settings and home health increased from 16.8% in 2008 to 21.5% in 2014. A similar pattern was identified between the inpatient and long-term care settings with a gap growing from 18.1% in 2008 to 25.3% in 2014.

The proportion of professionally educated general practice RNs living in metropolitan areas (48.5% in 2008 and 51.9% in 2014) was higher than in non-metropolitan areas (36.3% in 2008 and 31.7% in 2014). Moreover, the difference in the proportion of professionally educated RNs between metropolitan and non-metropolitans areas increased from 12.2% in 2008 to 20.2% in 2014. The two most populous and urban Texas regions had the highest proportion of professionally educated general practice RNs in both 2008 and 2014: North Texas (50.5% and 53.7%), and the Gulf Coast (50.5% and 56.4%).

### Academic Progression of General Practice RNs

Within the cohort of general practice RNs in 2008 still employed in Texas in 2014 ($n = 94{,}628$), only 10.1% furthered their education through formal degree programs during this timeframe. Among those initially educated as technical nurses, only 11.1% increased their academic preparation to the professional level. Among those already educated at the baccalaureate level, 8.9% acquired master's or doctoral degrees.

### Factors Associated With Academic Progression

The overall proportion of correct classification in the logistic regression model was 91.7% (99.2% for no progression and 27.5% for progression). Based on pseudo $R^2$ measures (Cox & Snell = 0.162 and Nagelkerke = 0.332) the model explained a small to moderate amount of variance in academic progression (Field, 2005). The strength and direction of associations are summarized in Table 3. Compared to Caucasian nurses, African American and Asian nurses were more likely to progress (OR = 2.38 and 1.63 respectively). Age (OR = 0.94) and experience (OR = 0.99) had a weak negative effect on progression. RNs in rural areas were less likely (OR = 0.86) to progress than those in metropolitan areas. Compared to RNs working in inpatient settings, RNs working in all other settings were less likely to progress. Notably, RNs in home health and long-term care were the least likely to further their education (OR = 0.40 and 0.46 respectively). Compared to RNs

| Characteristic | Total | Academic progression | | Wald (df) | Sig | Exp (B) |
| --- | --- | --- | --- | --- | --- | --- |
| | 94,628 | Yes<br>N = 9530 (10.1%) | No<br>N = 85,098 (89.9%) | | | Odds ratio |
| *Gender* | | | | | | |
| Female | 85,357 (90.2) | 8461 (88.8) | 76,896 (90.4) | | | |
| Male | 9271 (9.8) | 1069 (10.1) | 8202 (9.6) | 3.360 (1) | .067 | .92 |
| *Ethnicity* | | | | 613.17 (5) | .000 | |
| Caucasian | 62,901 (66.5) | 5539 (58.1) | 57,362 (64.7) | | | |
| African American | 8270 (8.7) | 1389 (14.6) | 6881 (8.1) | 477.94 (1) | .000 | 2.38 |
| American Indian | 303 (0.3) | 35 (0.4) | 268 (0.3) | .16 (1) | .694 | 1.09 |
| Asian | 10,344 (10.9) | 964 (10.1) | 9380 (11.0) | 114.63(1) | .000 | 1.63 |
| Hispanic | 10,757 (11.4) | 1188 (12.5) | 9569 (11.2) | .57(1) | .451 | 1.03 |
| Other | 2053 (2.2) | 415 (4.4) | 1638 (1.9) | 152.87(1) | .000 | 2.86 |
| *Mean Age (SD)* | 43.61 (10.59) | 37.40 (8.88) | 44.31 (10.54) | 296.19(1) | .000 | .94 |
| *Generation* | | | | 33.66(3) | .000 | |
| Traditionalist | 2603 (2.8) | 24 (0.3) | 2579 (3.0) | | | |
| Baby Boomer | 45,327 (47.9) | 2479 (26.0) | 42,848 (50.4) | 19.14(1) | .000 | 3.23 |
| Generation X | 40,913 (43.2) | 5669 (59.5) | 35,244 (41.4) | 13.03(1) | .000 | 2.74 |
| Millennials | 5785 (6.1) | 1358 (14.2) | 4427 (5.2) | 12.84(1) | .000 | 2.85 |
| *Mean Experience (SD)* | 15.02 (10.80) | 9.42 (7.81) | 15.68 (10.91) | 35.79(1) | .000 | .99 |
| *Region* | | | | 160.86(7) | .000 | |
| Panhandle | 4171 (4.4) | 520 (5.5) | 3651 (4.3) | | | |
| North Texas | 28,044 (29.6) | 2761 (29.0) | 25,283 (29.7) | .25(1) | .617 | 1.03 |
| East Texas | 6330 (6.7) | 435 (4.6) | 5895 (6.9) | 37.61(1) | .000 | .59 |
| Central Texas | 9634 (10.2) | 884 (9.3) | 8750 (10.3) | 1.07(1) | .302 | .93 |
| Gulf Coast | 25,638 (27.1) | 3010 (31.6) | 22,627 (26.6) | 9.97(1) | .002 | 1.23 |
| South Texas | 13,172 (13.9) | 1191 (12.5) | 11,981 (14.1) | .23(1) | .633 | .97 |
| Rio Grande Valley | 5642 (5.9) | 487 (5.1) | 5155 (6.0) | 11.46(1) | .001 | .76 |
| West Texas | 1997 (2.1) | 242 (2.5) | 1755 (2.1) | 1.73(1) | .188 | 1.14 |
| *Location* | | | | | | |
| Metropolitan | 83,465 (88.2) | 8650 (90.8) | 74,815 (87.9) | | | |
| Rural | 11,163 (11.8) | 880 (9.2) | 10,283 (12.1) | 9.80(1) | .002 | .86 |
| *Practice Setting* | | | | 261.84(4) | .000 | |
| Inpatient | 63,977 (67.8) | 7611 (80.1) | 56,366 (66.4) | | | |
| Outpatient | 16,231 (17.2) | 1111 (11.7) | 15,120 (17.8) | 64.49(1) | .000 | .68 |
| Home health | 4573 (4.8) | 242 (2.5) | 4331 (5.1) | 134.99(1) | .000 | .40 |
| Long-term care | 1203 (1.3) | 58 (0.6) | 1145 (1.3) | 29.32(1) | .000 | .46 |
| Other | 8414 (8.9) | 474 (5.0) | 7940 (9.4) | 92.52(1) | .000 | .53 |
| *Position* | | | | 34.74(3) | .000 | |
| Staff nurse | 46,563 (80.9) | 8384 (88.0) | 68,179 (80.1) | | | |
| School nurse | 4211 (4.5) | 217 (2.3) | 3994 (4.7) | 2.27(1) | .132 | 1.15 |
| Office nurse | 2981 (3.2) | 197 (2.1) | 2784 (3.3) | .12(1) | .728 | .97 |
| Other | 10,873 (11.5) | 732 (7.7) | 10,141 (11.9) | 22.67(1) | .000 | 1.30 |
| *Basic Academic Preparation* | | | | 323.61(2) | .000 | |
| < Baccalaureate | 60,289 (63.7) | 6854 (71.9) | 53,435 (62.8) | | | |
| Baccalaureate | 34,229 (36.2) | 2676 (28.1) | 31,553 (37.1) | 323.61(1) | .000 | .39 |
| Master's | 110 (0.1) | 0 (0.0) | 110 (0.1) | .00(1) | 1.00 | .000 |
| *Highest Academic Preparation 2008* | | | | 486.95(3) | .000 | |
| < Baccalaureate | 51,653 (54.6) | 5720 (60.0) | 45,933 (54.0) | | | |
| Baccalaureate | 40,977 (43.3) | 3766 (39.5) | 37,211 (43.7) | 85.00(1) | .000 | .64 |
| Master's | 1972 (2.1) | 44 (0.5) | 1928 (2.3) | 459.58(1) | .000 | .02 |
| Doctoral | 26 (<0.1) | 0 (0.0) | 26 (<0.1) | .000(1) | 1.00 | .000 |
| *Role Change* | | | | | .000 | |
| None | 80,762 (85.3) | 5364 (56.3) | 75,398 (88.6) | 6869.36(1) | | |
| AP Management | 8783 (9.3) | 1179 (12.4) | 7604 (8.9) | 473.13(1) | .000 | 2.29 |
| AP Education | 1896 (2.0) | 607 (6.4) | 1289 (1.5) | 1497.23(1) | .000 | 10.89 |
| AP Clinical | 3187 (3.4) | 2380 (25.0) | 807 (0.9) | 5965.91(1) | .000 | 97.13 |

Chi-Square for full model with 34 degrees of freedom = 15,185.13 (*p* =.000).

in staff nurse positions, RNs in other non-clinical positions were more likely to return to school and complete a higher degree (OR = 1.30). This supports the cross-sectional comparisons (Figure 2). Most general practice RNs (85.3%) in 2008 remained in general practice roles in 2014. The other 14.7% reported a role change to management (9.3%), education/research (2.0%), or clinical practice (3.4%). Notably, academic
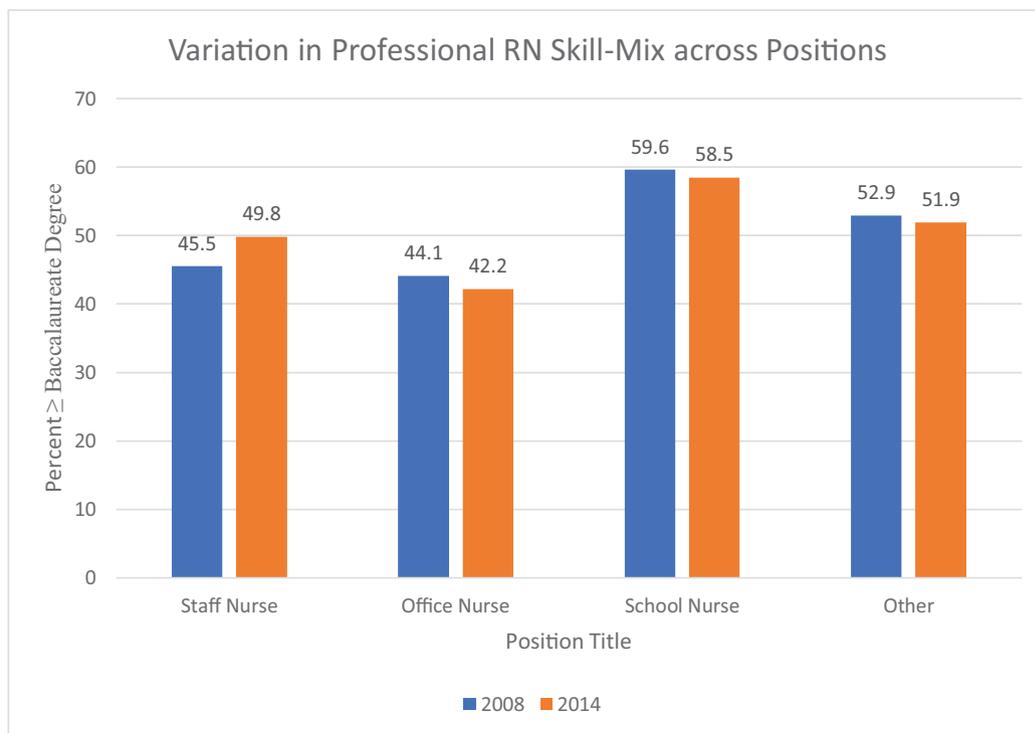
**Figure 2 – Variation in Texas RN Skill-Mix across positions.**

progression was more likely among RNs moving into advanced *clinical* practice roles (OR = 97.13) compared to RNs moving into *management* roles (OR = 2.29) or *education* roles (OR = 10.89).

## Discussion and Recommendations

This study was among the first to examine the academic preparation and progression of RNs in general practice roles across practice settings and geographic locations before and after the APIN initiative. The proportion of professionally educated RNs in this Texas sample (47.1% in 2008 and 50.2% in 2014) was slightly lower than previous reports that included RNs practicing in advanced roles. Our findings also demonstrate significant variation in the academic preparation and progression of RNs across the care continuum following initiation of APIN initiatives. Inpatient RNs comprised the highest educated segment of the general practice RN workforce with a professional skill-mix of 47.6% in 2008 and 53.1% in 2014. Moreover, inpatient RNs were significantly more likely than their non-hospital colleagues to advance from technical to professional education. Consequently, non-hospital practice settings appear more vulnerable to the effects of an undereducated RN workforce. Specific areas of vulnerability include home health, long-term care, and provider practice offices. These practice settings had the lowest proportion of professionally educated RNs before and after the APIN initiatives. Furthermore, RNs

in these settings were less likely (OR 0.40 to 0.68) than RNs in inpatient settings to advance from technical to professional education. Konver et al. (2012) also reported variation in academic progression by practice setting. In their longitudinal (2004 to 2009) study of newly licensed RNs, employment in the inpatient settings of intensive care and step-down units were significant predictors of academic progression.

Our findings point to a troubling divergence between the hospital and non-hospital segments of the RN workforce. Professional preparation for RNs is on the rise in hospitals and on the decline in other settings. The trends in professional RN skill-mix for non-hospital settings are concerning, and support previous assertions that the current RN workforce is not prepared to expand role expectations (Bauer & Bodenheimer, 2017). Home health, long-term care, and provider practice offices are staffed with fewer RNs compared to hospitals. Consequently, these practice settings are associated with greater RN independence, less supervision, and limited access to peer support compared to RNs in the inpatient setting. It is somewhat counterintuitive to staff these settings with the lesser educated RNs, particularly at a time of increasing patient acuity and complexity.

Non-metropolitan areas in this sample also have a disproportionate share of technically educated RNs who are less likely than their metropolitan counterparts to attain a professional degree. This is consistent with findings from some national studies (Baernholdt, Hinton,Yan, Xin, Cramer, & Dunton, 2017; USDHHS, 2013) but in contrast to others (Konver, Brewer,

Katigbak, Djukic, & Fatehi, 2012). In 2013, 46.6% of urban RNs had a baccalaureate degree compared to 33.9% of RNs in rural settings (TDSHS, 2013) and the difference in the proportion of professional RNs between urban and rural inpatient settings was almost 20% (Baernholdt et al., 2017). However, Konver et al. (2012) found that rural RNs with an associate degree were more likely to complete a higher degree program than their non-rural counterparts. However, post-hoc analyses revealed that 40% of the rural associate degree RNs in their sample relocated to suburban or metropolitan over the course of the 5-year study. The timing of enrollment in and/or completion of the professional degree program in relation to this relocation was not evaluated.

The geographic variation in professional and technical education among nurses is partly explained by the education level of the surrounding community. Like other occupations, RNs residing in counties with higher educational levels have higher levels of professionally educated nurses (Blustein, 2011). However, more than 60% of RNs in the most rural areas travel to work in less rural or urban areas (Skillman, Palazzo, Keepnews, & Hart, 2006). Therefore, estimates of professional skill-mix based on place of residence for rural/urban comparisons may contain some bias. Rural RNs often work much more independently and in non-hospital settings (Bushy, 2012), and the lower rate of professional RNs in rural areas is concerning. Factors contributing to this geography-based educational gap includes fewer nursing education programs offered in rural areas (Milone-Nuzzo, 2015), and insufficient rural broadband connections to support on-line education options (Perrin, 2017).

The professional RN skill-mix of 50.2% in 2014 falls far short of the IOM's goal of 80% by 2020. The modest (6.6%) improvement between the years of 2008 and 2014 is particularly concerning given the intensity of focus on this issue following the IOM (2011) report and the subsequent investment of APIN resources to support voluntary academic progression. Despite the emphasis on education reform and employer human resource policies, only 11.1% of the technically educated general practice Texas RNs in 2008 completed a professional degree by 2014. Though beneficial, these initiatives have proven insufficient to achieve the desired RN skill-mix in Texas. Notably, recent national projections by Spetz (2018) suggested that the IOM's recommended strategies will not likely yield the desired professional RN skill-mix until 2026.

It also is important to note that the lower professional RN skill-mix in rural and non-hospital settings represents unintended consequences of disparate employer human resources policies across practice settings. Warren and Mills (2009) identified organizational incentive as a significant predictor of a nurse's willingness to complete a higher academic degree program. Preferred organizational incentives identified include: mechanisms for tuition assistance (tuition reimbursement, forgivable loans for service, paid sabbaticals; and paid educational days); flexible scheduling; and access to onsite or web-based education. Another significant predictor of academic progression identified in their study was perceived professional advancement. Nurses who perceived a link between higher education and promotion to a more desirable position/role were more willing to return to school.

Findings from employer surveys consistently indicate that urban hospitals are more likely than other practice settings to engage in preferential hiring practices for professionally educated RNs and to implement human resource policies that facilitate RN academic progression (Pittman et al., 2013; Spetz, 2018). Schuler, Johnson, Stallings, and Li (2017) noted that although 70.6% of the institutions surveyed *preferred* BSN nurses, only 8.9% *required* a BSN. Notably, clinics were least likely to prefer BSNs. Tuition reimbursement was the most common employer incentive across all settings while incentives such as salary differentials and promotion requirements were far less common. In our study, the strongest correlate of academic progression was promotion from the general practice role to an advanced practice role. This supports the effectiveness of role/promotion-based incentives. Among the categories of advanced practice roles, graduate education is a requirement for licensure in advanced clinical practice roles, but not for roles in education and management. Employers have the option to promote RNs without professional education into these latter roles. The fact that only 13% of RNs promoted into management roles and 32% of RNs promoted into educator roles advanced to professional education, also highlights the relative influence of legislative mandates vs. employer incentivized approaches to academic preparation and progression.

Employee benefit incentives are costly for employers. Therefore, institutions with more resources are more likely to offer educational incentives for RNs and to have a larger increase in professional RN skill-mix than other practice settings. Hospitals are typically larger businesses than long-term care, home health and primary or specialty care provider practices, and consequently have the resources to provide more comprehensive benefit packages. Moreover, hospitals are heavily influenced by the Magnet and Pathway to excellence designation processes which include professional education targets for RNs. Thus, the trend in hospital RN hiring practices now favors professionally educated RNs over technically educated RNs (American Nurses Credentialing Center, n.d.). These disparate employer policies are leading the least educated RNs to seek employment in community-based practice settings that have fewer resources to support ongoing education.

The professional RN skill-mix in non-hospital settings also has implications for team performance. Nursing is the only health care discipline that does not require a professional education for entry into

practice. Our findings suggest that general practice RNs in the non-hospital setting are likely to be the least educated member of the interdisciplinary team. Social psychologists have consistently demonstrated that social identity and social categorization processes structure team member perceptions and behaviors (Haslam, 2014; van Knippenberg, De Dreu, & Homan, 2004). Education level is a characteristic often considered, consciously or unconsciously, in the determination of social status and group identity. Thus, educational diversity within a team may result in the categorization of professionally educated members as the in-group and other team members as an out-group. Social influence within a team or work group is contingent upon a shared social identity and in-group members wield the most influence. These social structures may limit acceptance of technical RNs as team leaders and weaken the capacity of nursing to influence care across the continuum.

The findings of this study must be interpreted in the context of study limitations. Study data were originally collected as part of the RN license application and renewal process in a single state; therefore, generalizability may be limited. Online survey completion occurs every 2 years and is a voluntary component of the license renewal process. It is reasonable to assume that respondents provide accurate data. However, data entry errors during completion of the survey are possible and cannot be rigorously evaluated during a secondary analysis. Study variables were limited by items included on the license renewal survey, and inclusion of additional variables with potential influence on academic progression was not possible. Therefore, the potential for omitted variable bias in our regression model must be considered (York, 2018). Finally, empirical evidence linking professional nurse education to patient outcomes is largely based on studies in the hospital setting. While it may be reasonable to believe that this education effect applies across practice settings, this assumption has not been thoroughly evaluated. Therefore, speculations about disparities in nursing care quality across practice settings based on nurse education levels must be interpreted with caution.

Despite these limitations, our findings have implications for research and policy. The work environments of non-hospital practice settings have received comparatively little attention by the research community. Consequently, the effect of nursing services on patient outcomes in these settings is not well documented. More research is needed to examine the effects of the work environment, including nurse education on patient care quality in non-hospital settings. Policy makers should explore mechanisms to integrate the evidence on the nurse education effect into value-based purchasing policies. Where there is evidence of added value for professional nurse education, facilities that employ higher proportions of professionally educated nurses should be rewarded with higher reimbursement rates. A direct link between reimbursement and nursing education could incentivize more employers of nurses to alter human resources policies in ways that support academic progression (e.g., preferential hiring for professionally educated nurses, requiring professional education for more job descriptions, and mechanisms for tuition assistance). Scholarship and student loan policies should also be revised to incentivize professionally educated nurses to seek employment in non-hospital and rural practice settings.

## Conclusions

A professionally educated RN workforce across the care continuum is needed to meet changing care demands and role expectations. Current voluntary-based strategies to enhance the professional RN skill-mix are insufficient and have resulted in educational disparities. This leaves patients in non-hospital and rural settings particularly vulnerable to the effects of an undereducated workforce. Undereducated RNs caring for a population of patients with increasingly complex health care needs is a concern and will constrain efforts to safely shift the care of complex patients into the community. In the absence of legislative mandates for professional RN education, new and/or stronger employer-based strategies are needed to address RN education in vulnerable practice settings.

## Supplementary materials

Supplementary material associated with this article can be found in the online version at doi:10.1016/j.outlook.2019.02.008.

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