The Future of the Registered Nursing Workforce in New York: State-Level Projections, 2015-2025

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Technical Report

KEY FINDINGS

Currently there is a relative balance between the supply of and demand for registered nurses (RNs) in New York State, with the supply of RNs being slightly greater than the demand.

Demand for RNs in New York is expected to grow between 2015 and 2025, especially in long-term care settings.

If current training and retirement patterns remain the same, the supply of RNs is expected to grow and continue to meet projected demand; however, changes in the estimated number of RN graduates or retirements could lead to future RN supply-and-demand imbalances.

The impact of health reform on future demand for RNs is less certain. It is not clear whether there will be declining demand for RNs in acute care that could be offset by an increase in demand for RNs in ambulatory care.

BACKGROUND

This study assessed the future supply of and demand for RNs in New York State using a Health Workforce Simulation Model (HWSM).[a] RNs comprise the single largest health profession in New York, with more than 288,000 licensed in the state. RNs work in a wide range of settings and play critical roles in the health care delivery system, but the system is changing. A number of factors are driving this change, including policies and programs in support of health reform. Many health reform initiatives focus on improving access to primary care and reducing the number of avoidable hospitalizations. For example, the goal of New York's Delivery System Reform Incentive Payment (DSRIP) program is to reduce the number of avoidable hospitalizations for Medicaid beneficiaries by 25%. Care delivery models are being developed to achieve these objectives, many using team-based approaches and creating new roles for health workers that emphasize better care coordination. However, it is not clear how these changes will impact the future demand for RNs.

Historically, the relationship between the supply of and demand for RNs has been characterized by periods of shortage and surplus. A 2004 study from the Health Resources and Services Administration (HRSA) indicated that there was a national shortage of approximately 168,000 RNs in 2000 and forecast that while the demand for RNs would increase between 2000 and 2020, the supply of RNs would not.[1] Around this time, however, RN education programs expanded their capacity. In New York, the supply of new graduates increased by 73% between 2004 and 2014 (from 5,218 to 9,006).[2] Due in part to this increase in production as well as a trend toward delayed retirement among RNs,[3] HRSA's latest analysis projects that there will be a surplus of RNs by 2025 in many states, including New York.[4]

This study examines the future supply of and demand for RNs in New York State using the same projection model used by HRSA, but with more finely grained data. While the HRSA study used national data to estimate the supply of RNs in New York, this study uses data from New York's RN Licensure Re-registration Survey.[b] This study also models different supply scenarios as well as the impacts of New York health reform initiatives on future demand for RNs in the state.

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[a] The Health Workforce Simulation Model used in this analysis was developed by the IHS Inc. and used to develop the Health Resources and Services Administration's current health workforce supply/demand projections.
[b] The New York RN Licensure Re-registration Survey is an ongoing survey conducted by the Center for Health Workforce Studies when RNs renew their licenses (every 3 years).

DATA AND METHODS

The HWSM used in this analysis is an integrated microsimulation model that forecasts the future supply of and demand for RNs. Microsimulation models represent an important new advance in modeling compared with traditional approaches. Traditional stock and flow models predict behaviors for groups of people—for example, traditional approaches might model the likelihood of RNs retiring between the ages of 45 and 50. In contrast, microsimulation models simulate individual decisions—modeling, for example, the likelihood of an individual retiring rather than a cohort of people retiring. Ultimately, by modeling individual behaviors, microsimulation models are more flexible with regard to the scenarios they can examine relative to other approaches.
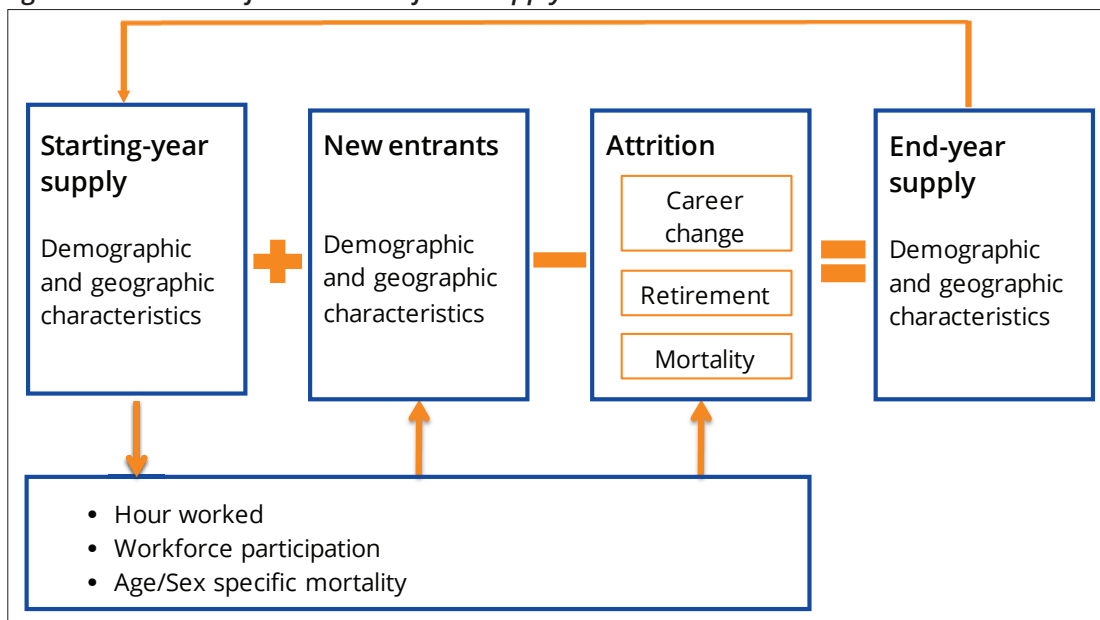
Health Workforce Simulation Model

The following is a brief overview of the HWSM supply-and-demand model.[5]

Supply Model

The supply model includes the following components:

- An individual-level database of RNs currently practicing in New York
- Estimates of the number of new entrants to the RN workforce in New York
- Equations predicting the number of hours per week an RN works
- Equations estimating the likelihood of RN exits from the workforce

Figure 1. Overview of Health Workforce Supply Microsimulation Model[5]

This figure was adapted from Exhibit 2 in the *Technical Documentation for Health Resources and Services Administration's Health Workforce Simulation Model.*[5]

Figure 1 provides an overview of the health workforce supply microsimulation model. The HWSM supply model includes an individual-level RN workforce database that contains information on the demographic and geographic characteristics of RNs practicing in New York. This file was created using data from the New York RN Licensure Re-registration Survey. This database contains information on more than 100,000 RNs, or approximately 35% of all RNs licensed in the state. HRSA's recent nursing forecasts used data drawn from the American Community Survey (ACS), a national source which tends to be less precise.

The number of new entrants to the RN workforce was estimated from individuals taking the National Council Licensure Examination (NCLEX) in New York for the first time. The HWSM assumed that individuals taking the exam in New York remained in the state to practice. Regression analyses were used to predict the number of hours an RN works and the likelihood of leaving the workforce. The model defines a full-time equivalent (FTE) as the average number of hours an RN works in one week (35.77 hours). Multiple datasets were used for these analyses, including the 2008 National Sample Survey of Registered Nurses, the ACS, and the Bureau of Labor Statistics.

Demand Model

The demand model includes the following components:

- An individual-level population database that includes demographic, socioeconomic, and health risk factors for individuals in New York
- Equations that predict health care utilization patterns
- Current staffing patterns by setting that translate demand for services into demand for RN FTEs

Figure 2. Overview of Health Workforce Demand Microsimulation Model[5]
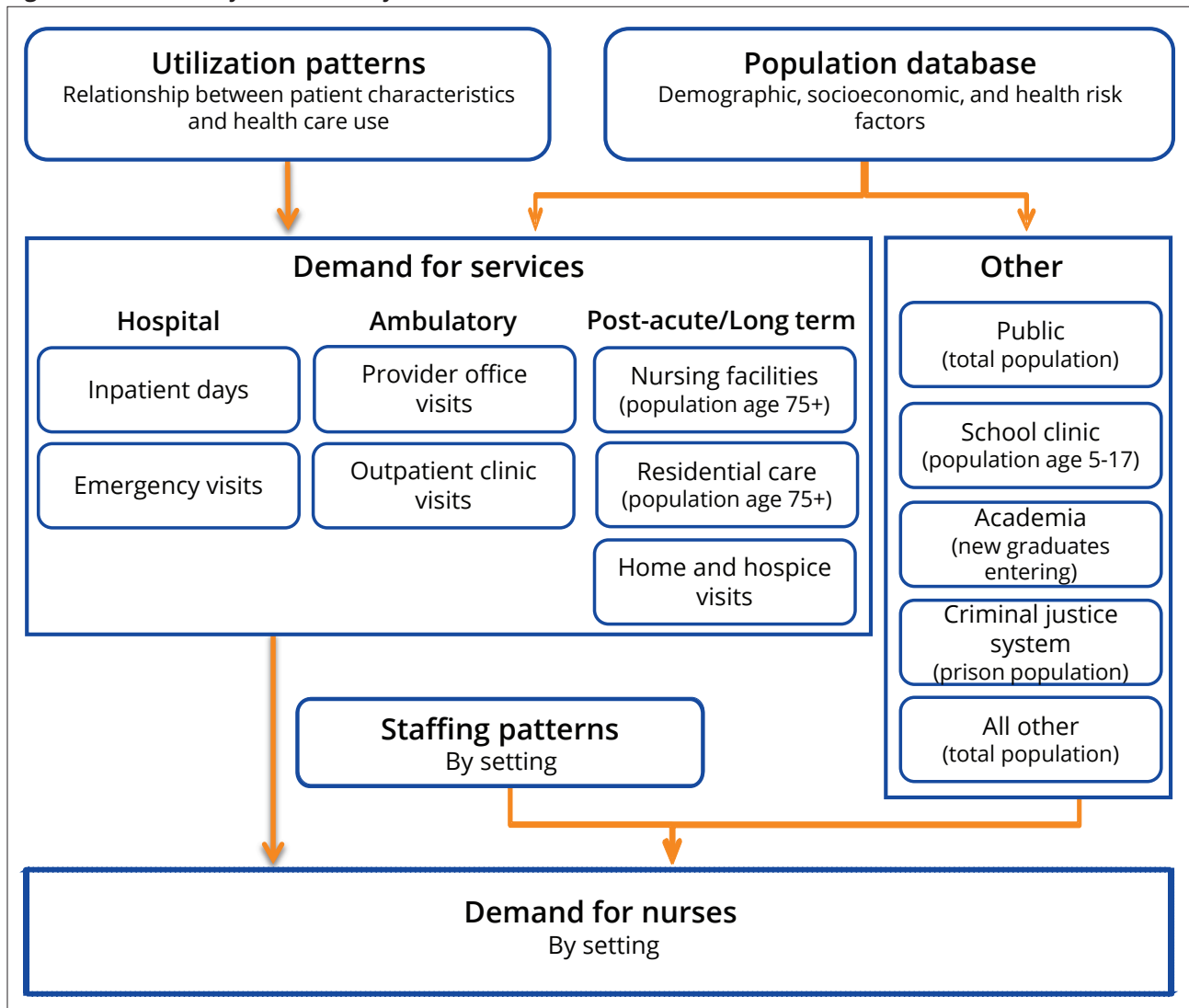
This figure was adapted from Exhibit 3 in the *Technical Documentation for Health Resources and Services Administration's Health Workforce Simulation Model*.[5]

Figure 2 provides an overview of the health workforce demand microsimulation model. The population database contains information on individual demographic, socioeconomic, and health risk factors for a representative sample of New York's population.[c] Regression equations are used to predict an individual's use of health services.[d] The population's health care utilization is then converted into demand for RNs using current staffing configurations.[e] The model assumes that the current demand for health care services is met by current staffing patterns.

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[c] The population database was constructed by combining the following data sets: American Community Survey, Behavioral Risk Factor Surveillance System, and National Nursing Home Survey.

[d] The regression equations used data from a variety of sources: Medical Expenditure Panel Surveys, National Ambulatory Medical Care Survey, National Inpatient Survey, and National Hospital Ambulatory Medical Care Survey.

[e] Information on staffing patterns was obtained from the Occupational Employment Statistics program of the Bureau of Labor Statistics.

Model Scenarios and Assumptions

A number of supply and demand scenarios are presented in this report. All of the supply and demand scenarios model RN FTEs, not individuals. Table 1 provides an overview of the different scenarios and their location in the Findings section.

Table 1. Overview of Scenarios

Scenarios	Location
Baseline supply scenario using New York RN Licensure Re-registration Survey data	Figures 3 through 6
Baseline supply scenario using American Community Survey data	Figure 3
Baseline demand scenario	Figures 4 through 6
Low graduate scenario (- 10% graduates each year)	Figure 5
High graduate scenario (+ 10% graduates each year)	Figure 5
Early retirement scenario (RNs retire on average 2 years early)	Figure 6
Delayed retirement scenario (RNs retire on average 2 years later)	Figure 6
Baseline demand scenario by setting	Tables 2 and 3
Demand by setting if avoidable hospitalizations for Medicaid beneficiaries are reduced by 25%	Table 3
Demand by setting if avoidable hospitalizations for all patients are reduced by 25%	Table 3

Two baseline supply scenarios are presented in this report. One scenario uses data from the RN Licensure Re-registration Survey and the other uses data from the ACS. Both supply projections assume that current RN entry and attrition patterns remain the same throughout the course of the modeling period.

The baseline demand scenario assumes that the supply of RN FTEs is currently 5% higher than the demand. This assumption is based on findings from annual surveys of deans and directors of RN education programs and health care employers. In 2006, 95% of the deans and directors of RN education programs indicated that there were "many jobs" for newly trained RNs, while in 2014 only 29% reported "many jobs."[2] This is corroborated by findings from a survey of hospital human resources directors who, since 2009, have reported no difficulty recruiting newly licensed RNs and more difficulty recruiting experienced RNs.[6] The baseline demand projection also assumes that current health care utilization patterns by demographics (eg, sex, age, and race/ethnicity), socioeconomics (eg, income), and health risk factors (eg, chronic conditions such as diabetes and asthma) remain constant throughout the forecast period.

Multiple RN graduation and retirement scenarios are presented in this report. The high graduate scenario assumes that there is a 10% increase in the number of RN graduates each year compared with the baseline supply scenario. The low graduate scenario assumes that there are 10% fewer graduates each year. The early retirement scenario assumes that RNs retire 2 years earlier than in the baseline supply scenario, while the delayed retirement scenario assumes that RNs retire 2 years later. These scenarios assume that the entry and exit patterns remain the same throughout the course of the projections.

This analysis considered 3 different demand scenarios. The first demand scenario is the baseline scenario. The second scenario assumes that the DSRIP program reduced the number of avoidable hospitalizations for Medicaid beneficiaries by 25%. The third scenario assumes that the number of avoidable hospitalizations for all patients was reduced by 25%. The latter 2 scenarios assume that the decreasing demand for RN FTEs in hospital inpatient settings is offset, to some extent, by an increase in demand for RN FTEs in ambulatory care settings.[7]

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FINDINGS

Figure 3 compares baseline supply scenarios using data from the New York Licensure Re-registration Survey ("New York data") and data from the ACS ("ACS data"). Both sources of data indicate that the supply of RN FTEs in New York will continue to grow if current training and attrition patterns remain the same. However, the New York supply data suggest that the supply of RN FTEs is growing at a slower rate. The New York data indicate that there are currently 191,033 RN FTEs practicing in the state and that supply will grow to 201,190 RN FTEs by 2025 (a 5% increase). In contrast, the ACS data suggest that the supply of RN FTEs will grow by 9% between 2015 and 2025.

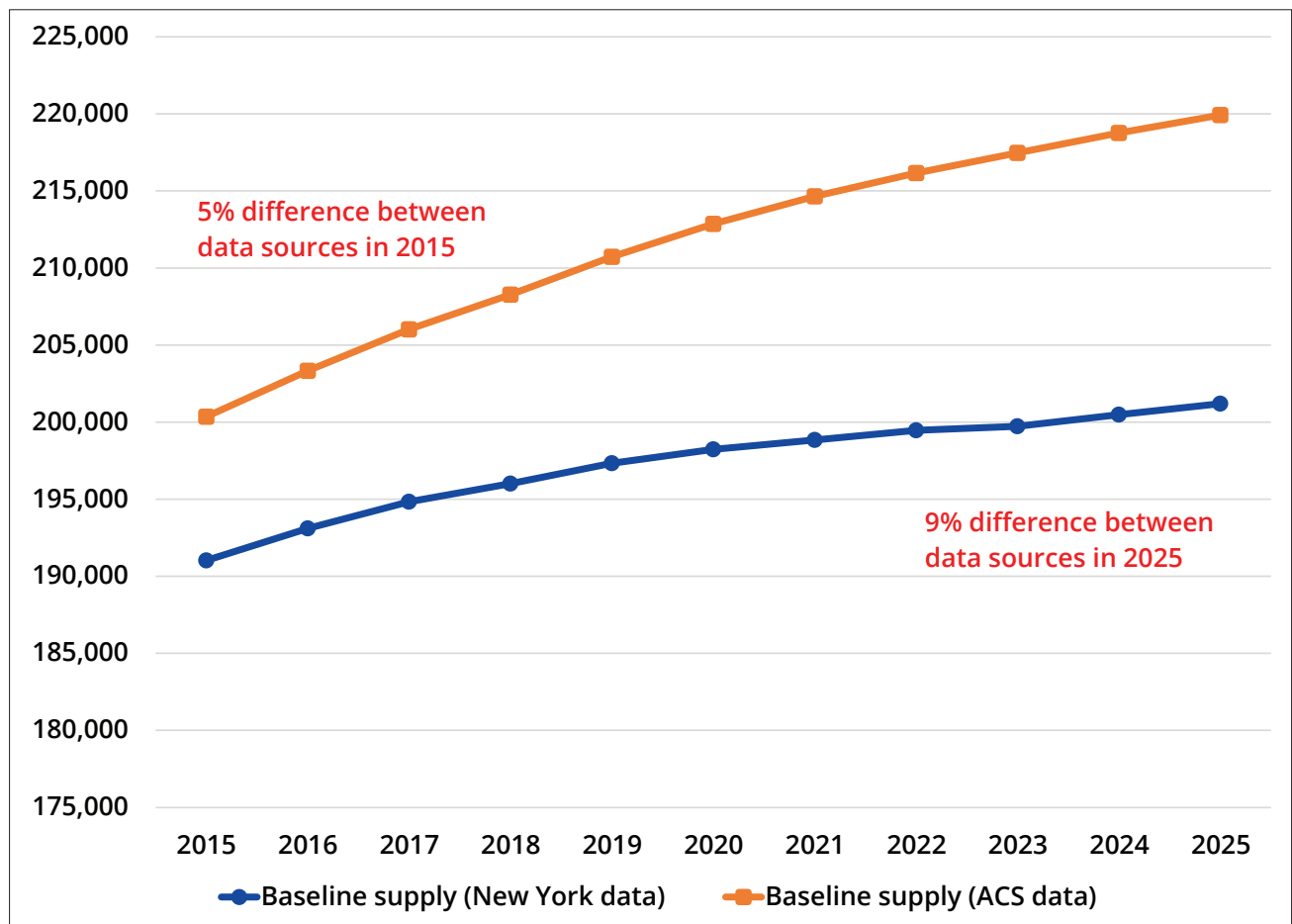*Figure 3. Projected Supply of RN FTEs in New York Using 2 Different Data Sources*

Figure 4 compares the baseline supply scenario using New York data to the baseline demand scenario. Currently, there is a relative balance between the supply of and demand for RNs in New York, with the supply of RNs being slightly greater. The supply of and demand for RN FTEs are growing at comparable rates in the state. The demand for RN FTEs is expected to grow by 11,462 FTEs between 2015 and 2025, representing a 6% increase in demand. If current training and retirement patterns remain the same, a small surplus of RNs is projected for 2025 (approximately 8,000 FTEs).

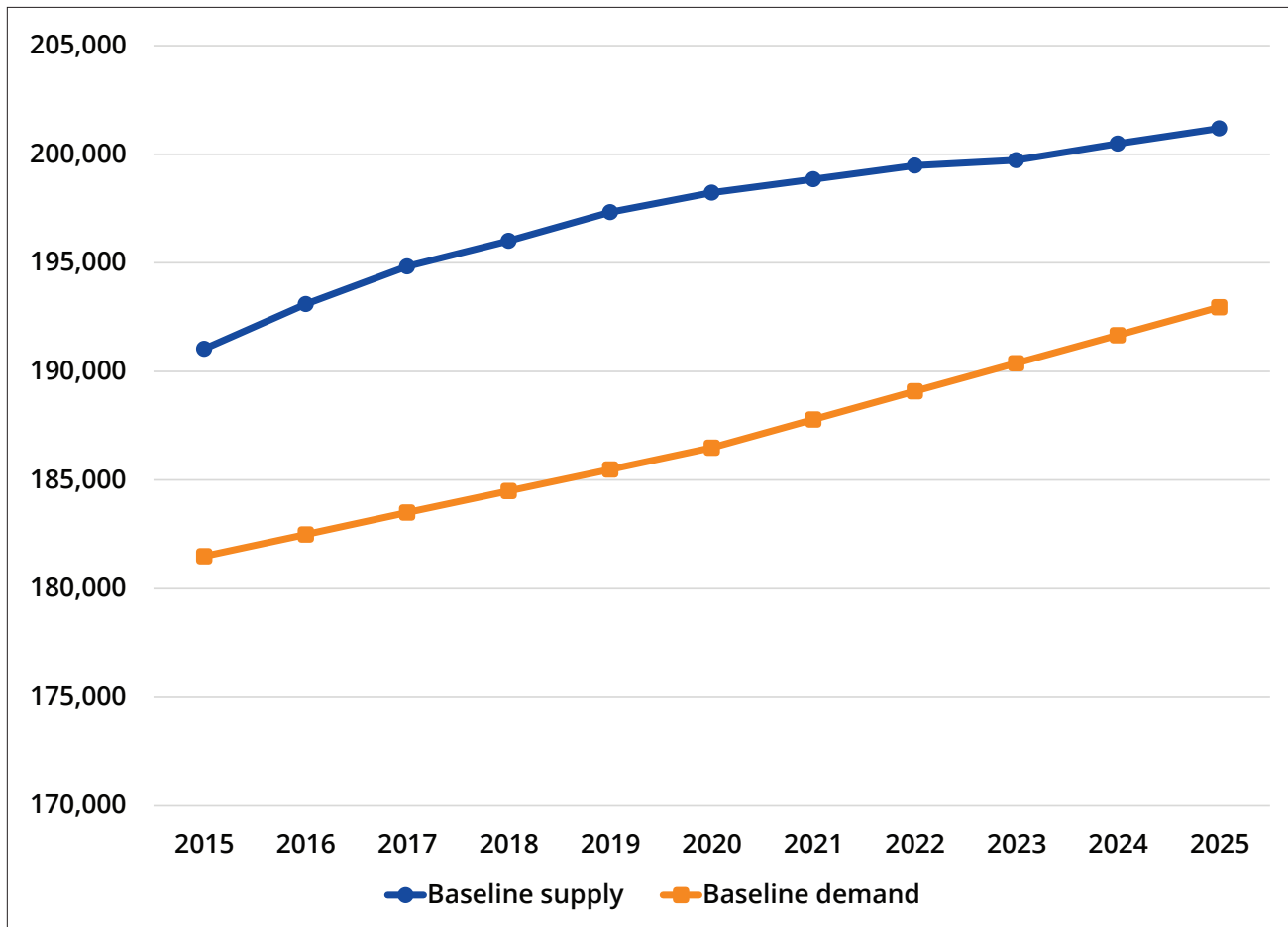*Figure 4. Projected Supply and Demand of RN FTEs in New York*

Figure 5 shows the low and high RN graduation scenarios, with the baseline supply and demand scenarios included in the figure for comparison. A 10% increase or decrease in the number of newly trained RNs would greatly affect the supply of RN FTEs. If New York trained 10% more RNs each year, there would be a projected surplus of nearly 18,000 RN FTEs by 2025. On the other hand, if New York produced 10% fewer RNs each year, there would be a small shortage of RN FTEs by 2025 (approximately 2,000).
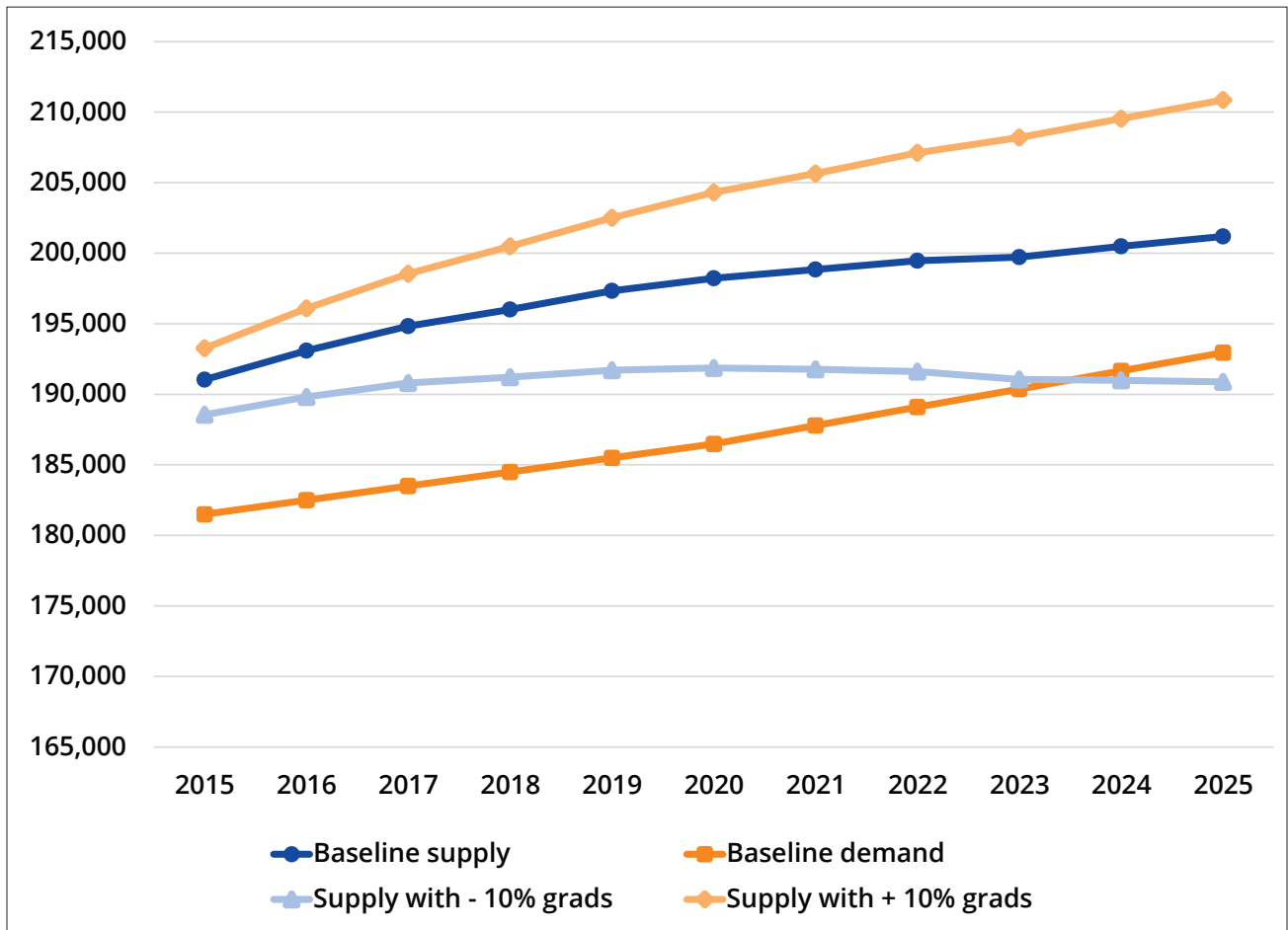
Figure 5. Low and High Graduation Scenarios

Figure 6 displays the early and delayed retirement scenarios along with the baseline supply and demand scenarios. If RNs delayed their retirement by 2 years on average, there would be a projected surplus of more than 18,500 RN FTEs by 2025. However, if RNs retired 2 years earlier on average, there would be a shortage of approximately 2,500 RN FTEs by 2025. As with graduation rates, minor variations in retirement rates can affect the supply of RN FTEs.

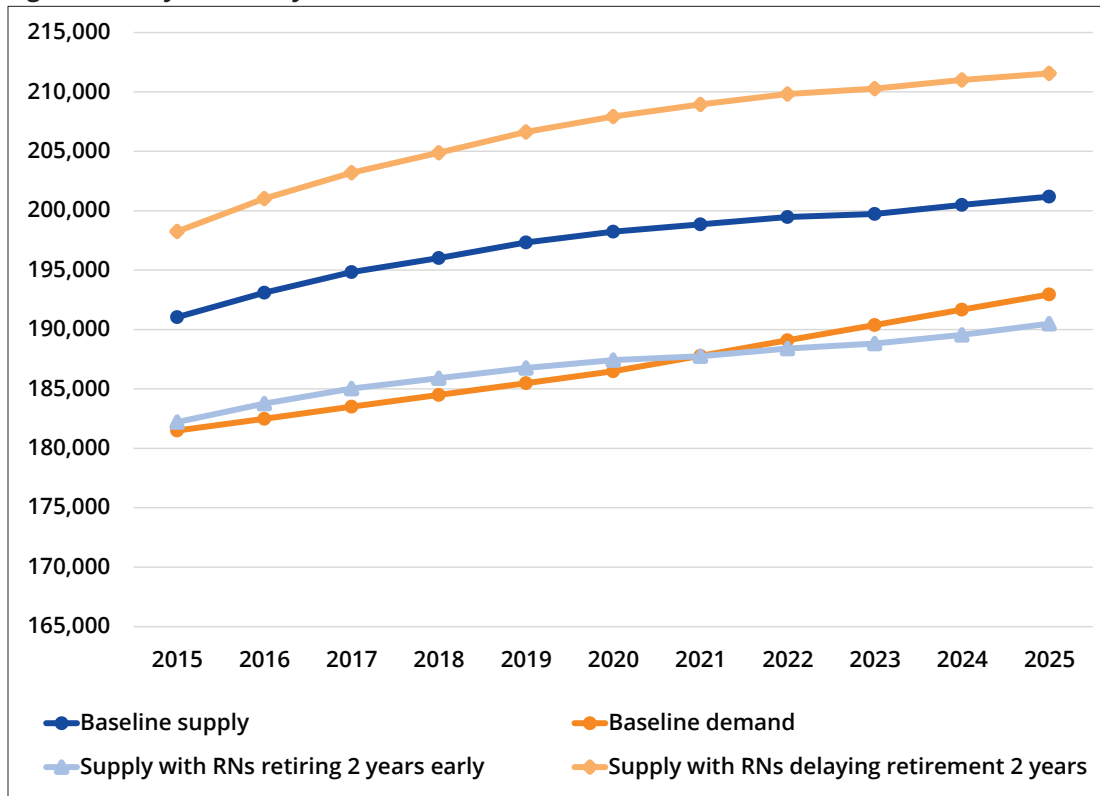*Figure 6. Early and Delayed Retirement Scenarios*

Table 2 displays the baseline demand for RN FTEs by setting. Overall, the demand for RN FTEs is expected to increase by 6% between 2015 and 2025. According to the baseline projection, the largest increase in demand for RN FTEs will take place in nursing homes and residential care facilities (19% increase in demand for both). The growth in demand for RN FTEs in these 2 settings may be attributed, in part, to New York's aging population. The next largest increase in demand is for RNs in hospital inpatient settings (7%). The demand for RN FTEs in all other settings is forecast to grow at a rate lower than the state average of 6%. The demand for RN FTEs is expected to grow the least in nursing education (0%) and emergency care (2%).

Table 2. Demand for RN FTEs by Setting

Setting	2015	2025	% Change
Hospitals			
Inpatient	104,142	111,265	7%
Outpatient	5,327	5,567	5%
Emergency	10,703	10,958	2%
Provider office	13,525	14,244	5%
Nursing home	9,247	11,025	19%
Residential care	2,972	3,543	19%
Home health	12,253	12,650	3%
School health	3,704	3,836	4%
Nurse education	5,450	5,468	0%
All other	14,168	14,397	2%
Total	181,490	192,952	6%

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Table 3 shows the results for 3 demand scenarios: the baseline scenario and 2 alternative scenarios. The DSRIP program in New York is expected to impact the demand for RN FTEs in hospital inpatient, hospital outpatient, and provider office settings over the next 10 years. (Only these settings are displayed in Table 3.) Once DSRIP achieves its goal of reducing avoidable hospitalizations among Medicaid beneficiaries by 25%, the growth in demand for RN FTEs in hospital inpatient settings is expected to drop from 7% to 6%. If the number of avoidable hospitalizations is reduced by 25% for all patients, that growth would be further reduced to 4%. Ultimately, depending on the reduction in the number of avoidable hospitalizations, the projected demand for RN FTEs in hospital inpatient settings in 2025 could range from 108,545 to 111,265.

The hospital inpatient setting is not the only setting affected by the reduction in the number of avoidable hospitalizations. A reduction in the number of avoidable hospitalizations would also shift more health care services to ambulatory care settings. The growth in demand for RN FTEs in hospital outpatient settings over the next 10 years is projected to increase to 7% under the DSRIP scenario and to 19% under the all-patients scenario. Likewise, the demand for RN FTEs in provider office settings would increase to 8% under the DSRIP scenario and to 20% under the all-patients scenario.

These scenarios suggest that the demand for RN FTEs will continue to grow in inpatient and outpatient settings, but some of the demand for RN FTEs will be shifted to ambulatory care settings if New York State health reform efforts to reduce the number of avoidable hospitalizations are successful.

Table 3. Demand Scenarios for RN FTEs by Setting

Setting	2015	2025			% Change Between 2015 and 2025		
	Baseline	Baseline	DSRIP	All Patients	Baseline	DSRIP	All Patients
Hospitals							
Inpatient	104,142	111,265	110,836	108,545	7%	6%	4%
Outpatient	5,327	5,567	5,688	6,332	5%	7%	19%
Provider office	13,525	14,244	14,552	16,200	5%	8%	20%

LIMITATIONS

There are several limitations to this study. First, RN projections are at the state level; as a result, it is impossible to assess the adequacy of the supply of RNs at regional, county, or local levels. Assessing the statewide supply of a profession can mask maldistribution in local communities.

Second, many of the parameters used in the model are based on national estimates, and some of these parameters might not match the characteristics of RNs practicing in New York. For example, retirement patterns in the model are based on national estimates, but it is possible that RNs in New York retire at an older or younger age, on average, than RNs in other states. If such discrepancies exist, the results of this analysis may be biased.

A third study limitation is related to the New York RN data used. Most of the data used in the analysis are from the years 2009 and 2010; consequently, changes in the RN workforce since 2010 are not reflected in this study.

Finally, it is challenging to assess the impact of state health reform efforts on only one profession. The potential impact of health reform on RNs is an important consideration, but it is not the only one. To fully understand the impact of health reform in New York on the health workforce, more professions need to be taken into account. This is especially important given that most of the emerging models of care use team-based approaches.

CONCLUSIONS

Currently there is a relative balance between the supply of and demand for RNs in New York State. This balance will likely be maintained over the next decade if current training and retirement patterns remain the same. The graduation and retirement scenarios examined in this report suggest that the supply of RNs in the state is sensitive to relatively small changes in entry into and exit from the profession. A 10% change in the number of graduates or an average 2-year change in retirement age can alter the forecast considerably.

While this analysis indicates that RN supply and demand are growing at comparable rates, a closer look at demand for RNs by setting shows that the utilization of health care is changing. The population of New York is growing older, and this is expected to impact the demand for RNs, particularly in long-term care settings. Health reform initiatives in the state will also impact the demand for RNs. If the DSRIP program succeeds in substantially reducing avoidable hospitalizations, a shift in the demand for RNs from hospital inpatient settings to ambulatory care settings could result.

This study provides important insights into the supply of and demand for RNs in New York over the next 10 years. While the findings suggest that the supply of RNs is in relative balance with the demand for RNs over that time period, this balance could be disrupted by a number of factors influencing supply, demand, or both. It may be advisable to update these forecasts regularly, particularly as delivery system transformation begins to accelerate. Further, access to more current state-level data on RN supply could improve the precision of future forecasts.

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