Forecasts of the Registered Nurse Workforce in California

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Table of Contents

Table of Exhibits

Executive Summary

This report presents supply and demand forecasts for the Registered Nurse (RN) workforce in California from 2011 through 2030. These new forecasts are based on data from the 2010 California Board of Registered Nursing (BRN) Survey of Registered Nurses, the U.S. Bureau of Health Professions (BHPr) 2008 National Sample Survey of RNs, and data extracted from the BRN license records. The 2011 forecasts indicate that the shortage of RNs identified in 2005 has narrowed, and in fact there may be a small surplus of nurses at the current time. In the long term, it is possible that supply continues to exceed demand, although it also is plausible that a new shortage of RNs will emerge.

The forecasts of RN supply take into account the aging of the RN workforce, new graduates (including those from out-of-state and international nursing programs), interstate flows of RNs, and changes in license status. The demand forecasts are based on national numbers of RNs per 100,000 population. The demand forecasts are compared to a forecast published by the California Employment Development Department (EDD), as well as an alternate forecast developed using data from the California Office of Statewide Health Planning and Development (OSHPD) and the California Department of Finance (DOF).

The demand for RNs can be measured and forecasted in many ways, reflecting disparate notions of what demand is or should be. Demand can be measured through benchmarks, such as the number of nurses per capita. Other demand forecasts may examine rates of population growth and population aging. Direct survey of employers can illuminate current demand for nursing positions. We developed several alternate forecasts of demand, using national RN-to-population data and estimating future hospital utilization in California. We also examined forecasts from EDD. Finally, we examined the likely impact of the Patient Protection and Affordable Care Act (PPACA). The demand estimates produced from these different strategies provide a range of possible scenarios for the future.

A comparison of the supply and demand forecasts, presented in the Executive Summary Exhibit, indicates that the magnitude of California's shortage depends on the measure of demand and the assumptions made about future supply. In 2011, there appears to be a small surplus of RNs, likely due to increased supply by older nurses who might otherwise retire or reduce their employment. If current employment patterns of RNs continue, and more nurses migrate to California from other states than leave California, California may find that it has a long-term surplus of RNs. However, if the number of RN graduations declines and net migration leads to lower supply, then a shortage could emerge again.

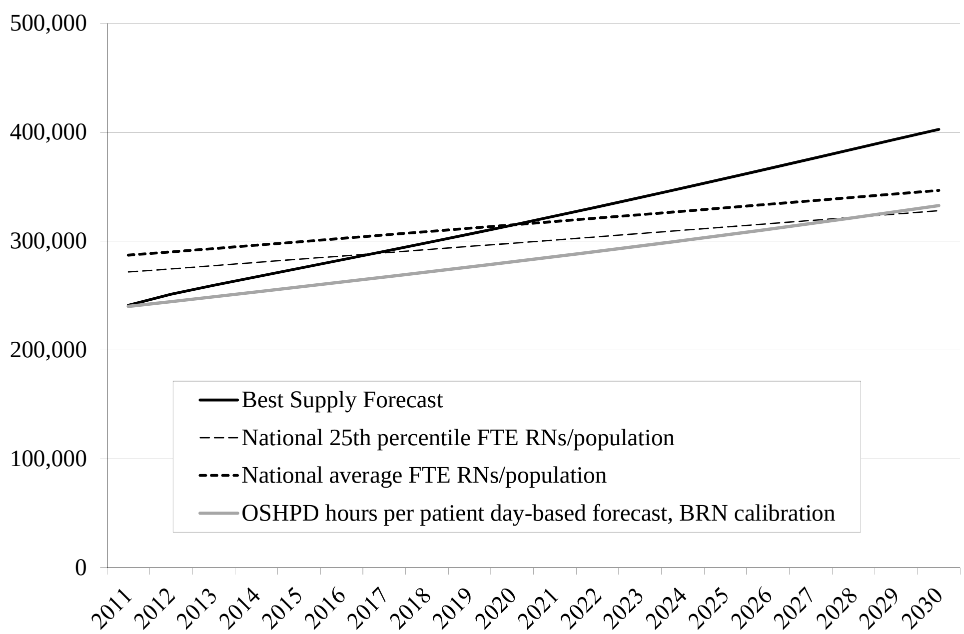
Which scenario prevails will depend on a number of factors:

- Whether RN graduations are sustained at the current level or increase
- Whether inter-state migration leads to more nurses entering California than leaving
- Whether older RNs continue to work at higher rates than in the past
- Whether younger RNs are able to work at rates similar to 2008, rather than the low rates of 2010

It is likely in the short run that more nurses will leave California than will enter, and if a surplus persists, then out-migration will prevail in the long term. Whether older RNs will continue to work at a higher rate than in the past and younger RNs will find jobs in California depends on the rate of economic recovery.

Policymakers should be cautioned that the 2011 BRN forecasts represent long-term forecasts and are not intended to reflect rapidly changing economic and labor market conditions. They also are based on the most currently available data; the factors that affect RN supply and demand are unlikely to remain static. The most important possible changes include: (1) the number of graduations from RN education programs; (2) inter-state migration; and (3) employment rates of older RNs. California leaders should observe closely the employment paths of recent nursing graduates who are entering a difficult job market and may choose to leave the nursing profession or leave California. Moreover, they should watch new enrollments in nursing programs, which could drop as state colleges and universities face tight budgets and as potential students hear there might not be enough nursing jobs. California will likely need to maintain the present number of nursing graduates in order to meet long-term health care needs.

Executive Summary Exhibit: Projected full-time equivalent supply of and demand for RNs, 2011-2030.



Introduction

The labor market for registered nurses (RNs) has been characterized by cycles of shortage and surplus since World War Two. The most recent period of shortage began in the late 1990s (Buerhaus 1998; Buerhaus & Staiger 1999), and persisted through the late 2000s. Periods of nursing shortage generate significant challenges because they drive higher health care costs as wages rise (Spetz and Given, 2003), and because patient outcomes are impacted by the level of nurse staffing in hospitals and other care facilities (Needleman et al., 2002; Aiken et al., 2002).

More recently, however, the nursing shortage appears to have abated in much of California and the United States. A survey of California hospital Chief Nursing Officers in early 2011 found that, on average, they perceive that supply and demand are in balance. This change in the labor market can be attributed to several trends. First, nursing school enrollments expanded substantially in California, more than doubling between 2001 and 2010 (Bates, Keane, & Spetz, 2011). This expansion of RN supply would have alleviated the shortage in many regions on its own. In addition, the national economic recession further mitigated the shortage by leading to an increase in the workforce participation of RNs who would otherwise retire or reduce their hours for work. It has been estimated that nearly all the hospital employment increase in the past decade can be attributed to growth in RN supply during economic recessions (Buerhaus and Auerbach, 2011). The economic recession also has reportedly dampened demand for newly-graduated nurses. In late 2010, a survey of Chief Nursing Officers found that there were fewer than 6,500 full-time equivalent vacant positions for RNs statewide (Bates, Keane, & Spetz 2011), while the 2010 BRN Survey of Registered Nurses indicates that nearly 7,700 RNs are seeking employment (Spetz, Keane, & Herrera, 2011).

Few people expect the current perceived surplus of RNs to continue. Nurses who delayed retirement, re-entered the labor force, or increased their hours of work due to the economic recession are likely to retire or reduce their employment as the economy recovers (Buerhaus, Auerbach, & Staiger 2009; Buerhaus & Auerbach 2011). At the same time, the passage of the Patient Protection and Affordable Care Act (PPACA) is expected to lead to an increase of more than 30 million additional Americans with health care insurance coverage in the near future, which will likely increase demand for RNs and other health professionals (Coffman & Ojeda 2010; Staiger, Auerbach, & Buerhaus 2011). These and other changes have introduced uncertainty regarding the future supply and demand for RNs.

Forecasts of future supply of and demand for RNs help policymakers and health care leaders assess likely future scenarios and develop timely strategies to rectify labor market imbalances. Forecasting is particularly important for labor markets in which shortages are frequent and can have an impact on public health.

This report updates forecasts of RN supply and demand in California, which were first developed for the California Board of Registered Nursing (BRN) in 2005 and subsequently updated in 2007 and 2009 (Spetz and Dyer, 2005; Spetz, 2007; Spetz 2009). These new forecasts take into account changes in supply that developed as a result of the economic recession, as well as potential impacts of the implementation of PPACA. New data from the 2010 BRN Survey of Registered Nurses (Spetz, Keane, and Herrera, 2011), the 2008 National Sample Survey of RNs (U.S. Department of Health and Human Services, 2010), the 2009-2010 BRN Annual Schools Report (Bates, Keane and Spetz, 2011), and BRN license records are used to update the model of

RN supply. For the first time, the demand estimates are informed by surveys of employers conducted in late 2010 and early 2011 with support from the Gordon and Betty Moore Foundation (Bates, Keane, & Spetz 2011). Recent changes in demand for health care services, as well as the published literature on the likely impact of PPACA on demand for health care services, inform the revised demand forecasts.

The Supply of RNs

California's RN workforce consists of nurses with active California licenses; there were 310,739 RNs residing in California on March 30, 2011. The RN workforce constantly changes with the entrance of newly graduated nurses, migration of nurses from other states and countries, retirements, temporary departures from nursing work, and fluctuations in the number of hours nurses choose to work. These factors can be grouped into three categories:

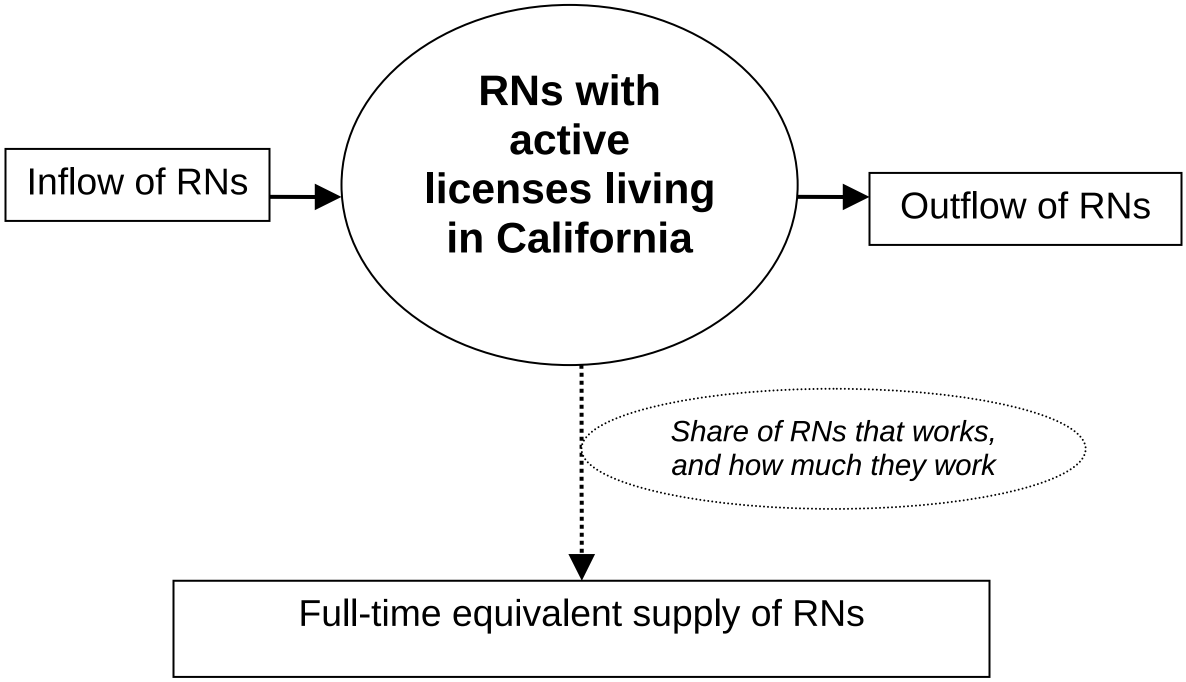
- Inflows of nurses: Additions to the number of RNs in California.
  - Graduates from California nursing programs;
  - Graduates of nursing programs in other states who obtain their first RN license in California;
  - Internationally-educated nurses who immigrate to California and obtain their RN license;
  - Interstate migration of RNs to California;
  - Changes from inactive to active license status; and
  - Changes from delinquent to active license status.
- Outflows of nurses: The departure of RNs from the California population.
  - Migration out of California (to another state or country); and
  - Movements from active to inactive or lapsed license status.
- Labor force participation factors: Decisions to work, and how much to work.
  - Share of RNs with active licenses and California residence that works in nursing; and
  - Average number of hours worked per week by RNs working in nursing.

The inflows are added to the number of RNs with active licenses, which is called the "stock" of nurses available to work, and the outflows are subtracted from the stock. Estimates of the labor supply of RNs are derived from the total number of RNs potentially available to work and how much they choose to work in nursing. This number is expressed as full-time equivalent employment (FTEE) in order to account for differences in the work commitments of those employed full-time and part-time. Figure 1 illustrates this model of the supply of RNs in California, commonly called a "stock-and-flow model."

Method of Calculating RN Supply

As inflows, outflows, and employment decisions change over time, so does the RN workforce. At first glance, it seems clear that as long as the inflow of RNs is greater than the outflow, the RN workforce will grow over time. However, such a comparison between total inflow and outflow does not take into account the aging of the RN workforce. The age distributions of the stock of RNs and each inflow and outflow component affect supply. Thus, the model "ages" each age cohort to capture the impact of age on the supply forecast.

Exhibit 1: A model of the supply of RNs.



In the supply model, the number of RNs with active licenses who reside in California is divided into 13 age categories: under 25, 25-29, 30-34, 35-39, 40-44, 45-49, 50-54, 55-59, 60-64, 65-69, 70-74, 70-79, and 80 and older. We assume that one-fifth of RNs in each age category moves into the next (older) age category in the subsequent year, until they reach the oldest age category.[1] We add the inflow estimates to and subtract the outflow estimates from each age group of RNs to obtain a forecast of the new stock of RNs for the next year. Finally, we apply rates of employment and hours worked per week in nursing to the estimated stock of RNs to obtain estimated FTEE supply. This calculation is iterated through 2030 to obtain our yearly forecasts of California's RN supply.

For some factors in the supply model, differing estimates are available, with no indication of which estimate is most reliable. For other factors, there is uncertainty as to whether current data are applicable to what might happen in the future. For example, in 2010 a greater share of nurses over age 60 was employed as compared with 2008. This increase is likely because older nurses are delaying their retirement due to declines in the value of their retirement savings. If interest rates and the stock market rise, these nurses may decide to stop working and employment rates might return to pre-recession levels. However, it also is possible that "baby boomer" nurses have different intentions regarding retirement than did previous generations, and the higher rate of employment in this age group will persist regardless of economic circumstances. For variables with such uncertainty, a range of estimates is offered representing the highest and

[1] All but one age group spans 5 years, so if nurses are evenly distributed across those five years, 20% - or 1 in 5 – would move to the next age group each year. The youngest age group spans 7 years, but there were no RNs under 20 years old in 2011; thus, the 20% assumption seems reasonable for this group as well.

lowest values. In the final models, the "best estimate" for each parameter is the average of the low and high estimates, unless otherwise noted.

Estimates of Supply Model Factors

Stock of RNs in 2011

Data on the number of RNs with active licenses were obtained from the BRN for March 30, 2011. At that time, 310,739 RNs had active licenses and a California address. The 54,084 RNs with addresses outside California were not included in the stock of RNs because California's border regions are generally rural and thus few nurses are likely to commute regularly from out of state. Some nurses might intermittently come to California as traveling nurses, thus supplanting the state's supply, but these are not part of the regular stock of RNs. Traveling nurses are discussed further below.

The number of RNs with active licenses and California addresses was divided into 13 age groups, as seen in Exhibit 2. These age groups are used throughout the model. Exhibit 2 compares the 2011 data to that from 2009. The total number of licensed RNs living in California grew by 18,174 (6.2%), and increased all age groups except 45 to 54 years and 80 years and older. The largest increases were seen among nurses 25 to 29 years (21.9%), 40 to 44 years (18.2%), and 65 to 69 years (15.5%).

Graduates from California nursing programs

Data on new graduates from California nursing programs who receive their first RN license in California were obtained from the BRN. According to the 2009-2010 BRN Annual Schools Report, there were 11,512 new graduates from California nursing programs in the 2009-2010 school year (Bates, Keane, & Spetz 2011). Over the past several years, there has been substantial growth in new enrollments in RN education programs. Exhibit 3 presents the numbers of enrollments and graduates from the past seven Annual Schools Reports.

Growth in RN program enrollments will lead to growth in graduations in future years. Associate Degree Nursing (ADN) programs are designed so students can complete the nursing component of the degree in two years. In most Baccalaureate of Science Nursing Degree (BSN) programs, students are formally enrolled in nursing major courses during the last 2.5 to 3 years of the pre-licensure BSN degree program, unless the program is an accelerated BSN degree program. Thus, enrollment changes will translate to graduation changes two to three years into the future.

To predict future graduations, actual enrollments for each year of the Annual Schools Report were compared with graduations two years later. From 2005-2006 through 2009-2010, graduations averaged 89.3 percent of the number of enrollments two years prior, which represents a slight decrease from the 91.2 percent "productivity rate" used in the 2009 forecasts. This rate was used to estimate future graduations. The forecasted number of graduations in 2010-2011 is thus 89.3 percent of the known enrollments from 2008-2009.

Exhibit 2: Counts of actively-licensed RNs living in California, by age group, March 30, 2011, and March 26, 2009

	March 30, 2011		March 26, 2009	
Age Group	Count	% of Total	Count	% of Total
Under 25	2,763	0.89%	2,401	0.82%
25-29	21,681	6.98%	17,786	6.08%
30-34	28,910	9.30%	25,419	8.69%
35-39	35,189	11.32%	35,104	12.00%
40-44	37,045	11.92%	31,335	10.71%
45-49	33,136	10.66%	34,188	11.69%
50-54	39,547	12.73%	43,281	14.79%
55-59	45,956	14.79%	43,386	14.83%
60-64	33,980	10.94%	30,212	10.33%
65-69	19,135	6.16%	16,569	5.66%
70-74	8,568	2.76%	8,069	2.76%
75-79	3,403	1.10%	3,360	1.15%
80+	1,426	0.46%	1,455	0.50%
Total	310,739	100.00%	292,565	100.00%

Source: California Board of Registered Nursing license records

Exhibit 3: Enrollments and graduations from RN education programs, 2001-2002 through 2009-2010.

Survey year	Number of new enrollments	Growth in enrollments	Number of graduations	Growth in graduations
2001-2002	6,422	4.8%	5,346	3.2%
2002-2003	7,457	16.1%	5,623	5.2%
2003-2004	7,825	4.9%	6,158	9.5%
2004-2005	8,926	14.1%	6,677	8.4%
2005-2006	11,131	24.7%	7,528	12.8%
2006-2007	12,709	14.2%	8,317	10.5%
2007-2008	12,961	2.0%	9,580	15.2%
2008-2009	13,988	7.9%	10,570	10.3%
2009-2010	14,228	1.7%	11,512	8.9%

Source: Bates, Keane, & Spetz, 2011. 2009-2010 Annual School Report Data Summary and Historical Trend Analysis.

Graduations after the 2013-2014 academic year are more difficult to estimate, because enrollments for 2010-2011 are not yet known. To estimate graduations beyond the 2011-2012 academic year, we used estimates reported by schools of their new enrollments for future years. They estimated their 2010-2011 new enrollments to be 13,055, which is a 12.5 percent decline relative to the previous year. Their forecasted new enrollment for 2011-2012 is 13,223. These estimates were multiplied by 89.3 percent to obtain forecasted graduations for 2012-2013 and 2013-2014. Based on current funding for higher education, the forecasts assume that nursing program enrollments will be relatively stable after the 2011-2012 academic year. In the forecasting model, the "low" estimate of growth in RN education after 2013-2014 is 0%, the high estimate is 2%, and the "best" estimate is 1%. Predicted graduations from 2008-2009 through 2013-2014 are presented in Exhibit 4.

Exhibit 4: Predicted growth in graduations based on known growth in new enrollments.

Academic year	Actual/forecasted new enrollments	Forecasted graduations
2008-2009	13,988*	10,526*
2009-2010	14,228*	11,577*
2010-2011	13,055	12,494
2011-2012	13,223	13,324
2012-2013		11,661
2013-2014		11,811

* Actual number of enrollments and graduations based on Annual Schools Report.
Note: Forecasts of enrollments are provided by RN programs in the Annual Schools Survey. Forecasted graduations are 89.3 percent of enrollments two years prior. Source: Bates, Keane, and Spetz, 2011. 2009-2010 Annual School Report Data Summary and Historical Trend Analysis.

Graduates from nursing programs in other states who obtain their first license in California

Each year, some graduates of nursing programs in other states obtain their first RN license in California. According to the BRN, in the 2009-2010 fiscal year, 910 out-of-state graduates obtained their first license from California; this is the high estimate of out-of-state graduates who move to California. BRN records also indicate that 769 of these nurses are living in California; this is the low estimate. The "best estimate" for the inflow of new licensees from other states is the average of the high and low estimates: 840 nurses.

Immigration of internationally-educated nurses

In the 2009-2010 fiscal year, the BRN reports that 3,900 internationally-educated nurses passed the National Council Licensure Examination for RNs (NCLEX-RN) exam and received initial licensure as an RN in California. In 2011, 2,054 of these nurses lived in California; the remainder lived in other states or countries. Since the 1997-1998 fiscal year, the number of first licenses issued to internationally-educated nurses has ranged from 1,145 to 4,107 annually. In the supply model, we use total number of 2009-2010 international graduates as the high estimate of the number of immigrants. We use the number that lives in California as the low estimate. The best estimate is the average of the high and low estimates: 2,977 internationally-educated RNs immigrate to California each year.

Age distributions of new graduates

Inflows of new graduates are added to the stock of RNs by age group. The BRN Annual Schools Report uses an uneven set of age groups for new California graduates: 18-25, 26-30, and then ten-year age groups for graduates over age 30. To create consistent groups of graduates in the forecasting model, we allocated the graduates into five-year groups. Exhibit 5 shows the redistributed age breakdown of new graduates from California nursing programs. RN graduates from nursing programs in other states seeking initial licensure as an RN in California are assumed to have the same age distribution as California graduates.

BRN records of internationally-educated nurses who receive initial U.S. licensure in California include the birthdates of these nurses. The age distribution of internationally-educated RNs who lived in California and obtained licenses in 2009-2010 is presented in the last column of Exhibit 5; these data are used as the forecast of the age distribution for all internationally-educated RNs receiving first licenses in California.

Exhibit 5. Estimated age distribution of new graduates from California RN programs

Age group	Graduates of US RN programs	Internationally-educated graduates
18-25*	31.5%	7.7%
26-29*	27.1%	16.0%
30-34	12.8%	17.9%
35-39	12.8%	26.1%
40-44	6.5%	13.1%
45-49	6.5%	8.6%
50-54	1.4%	7.2%
55-59	1.4%	2.4%
60-64	0.2%	0.9%
65-69	0.0%	0.1%

* The age groups for internationally-educated RNs are "Under 25" and 25-29.
Sources: Waneka and Spetz, 2009, 2007-2008 Annual School Report Data Summary and Historical Trend Analysis; 2009-2010 California BRN licensing records.

Interstate migration of RNs to California

Estimates of interstate migration to California were developed in two ways. The low estimate of interstate migration was computed from BRN records of nurses requesting license endorsement from another state into California. Exhibit 6 presents the number of RNs requesting endorsement to California who have permanent addresses in California. The table also presents the number of RNs living in states other than California in 2007, as reported in the 2008 National Sample Survey of Registered Nurses (NSSRN) from the U.S. Bureau of Health Professions (BHPr) in 2010, and the estimated rate of those RNs moving to California, which is the number requesting endorsement divided by the number of RNs in other states.

Exhibit 6. Requests for license endorsement into California, 2009-2010 (Low estimate)

Age Category	Number requesting endorsement & living in CA	Number of RNs in other states, 2007	Percent of RNs living in other states requesting endorsement
Under 25	72	79,394	0.091%
25-29	522	207.750	0.251%
30-34	415	280,005	0.148%
35-39	290	331,154	0.088%
40-44	226	350,765	0.064%
45-49	158	441,724	0.036%
50-54	172	495,619	0.035%
55-59	142	396,319	0.036%
60-64	71	249,708	0.028%
Over 64	33	226,429	0.024%

Sources: California Board of Registered Nursing license records, 2009-2010; Bureau of Health Professions, 2010.

The high estimate of interstate migration is based on data from the 2008 BHPr NSSRN. The NSSRN asked respondents about their current and former state of residence with the following questions:

(1) Where do you currently reside?

(2) Did you reside in the same city/town a year ago?

(3) If the person does not live in the same place as one year previously: Where did you reside a year ago?

Using the variables corresponding to these questions in the 2008 NSSRN and applying sample weights, we were able to estimate the number and age distribution of RNs who did not reside in California in 2007, but did so in 2008. The share moving to California between 2007 and 2008 is divided by the estimated number of RNs residing in other states in 2007 to obtain a rate of migration into California by out-of-state RNs. Exhibit 7 presents these estimates.

Exhibit 7. Estimated movements from other states to California, 2007-2008 (High estimate)

Age Category	Number moving to California, 2007-2008	Number of RNs in other states, 2007	Percent of RNs moving to California
Under 25	1,569	79,394	1.98%
25-29	4,146	207.750	2.00%
30-34	5,311	280,005	1.90%
35-39	4,811	331,154	1.45%
40-44	2,556	350,765	0.73%
45-49	3,246	441,724	0.73%
50-54	1,869	495,619	0.38%
55-59	2,161	396,319	0.55%
60-64	760	249,708	0.30%
Over 64	379	226,429	0.17%

Source: Bureau of Health Professions, 2010.

Rates of migration to California are a function of the population of RNs residing in other states. Thus, an estimate of the future *national* RN population is required. Two sources of data were examined to obtain this estimate. In 2008, the National Sample Survey of Registered Nurses estimated that the US RN population was 3,063,162, and the population in California was 277,575. Thus, the US RN workforce was 11.035 times the number of RNs living in California. The second calculation was based on the U.S. Bureau of Labor Statistics (BLS) forecast that there will be 3,200,000 RNs employed nationally in 2018, and the California Employment Development Department (EDD) estimate that there will be 297,200 RNs employed in California (Employment Development Department, 2010; Bureau of Labor Statistics, 2007); these data estimate that the number of employed RNs in other states will be between 10.767 times the number employed in California.

The above estimates of the number of nurses residing outside California were used to estimate the total non-California population of RNs that might move to California each year. The low estimate is that the non-California RN population is 10.767 times the California population; the high estimate is 11.035 times the California population. These estimates are combined with each of the rates of movement presented in Exhibits 6 and 7 to obtain the estimated inflow of RNs from other states as a *rate* of the California RN population. These rates are presented in Exhibit 8. Note that a simple average of these estimated rates of migration to California are significantly higher than those based on earlier data. During 2007 and early 2008, California's economy was growing rapidly and both the U.S. and California economy were strong. In-migration rates was likely to have been higher at that time than we might expect in the future. Thus, the "best estimate" is calculated as:

Best estimate = 0.66*low estimate + 0.34*high estimate

Because future interstate movements of nurses are highly uncertain, this variable is largely responsible for the overall difference between the high supply forecast and the low forecast.

<u>Movements from inactive to active license status</u>

We obtained data from the BRN, by age category, on the number of RNs with California addresses changing from inactive to active license status for the most recent fiscal year. The total has ranged from 189 nurses in 2002-2003 to 549 nurses in 2007-2008. The 2009-2010 data are used to estimate the number and age distribution of RNs changing from inactive to active license status (Exhibit 9).

Exhibit 8. Rates of migration of RNs to California from other states as a function of the California RN population.

	BLS Forecast Multiplier = 10.767		NSSRN Forecasts Multiplier = 11.035			
	High estimate (NSSRN)	Low estimate (BRN)	High estimate (NSSRN)	Low estimate (BRN)	Best estimate 2011	Best estimate 2009
Under 25	21.3%	1.0%	21.8%	1.0%	8.1%	8.3%
25-29	21.5%	2.7%	22.0%	2.8%	9.3%	7.5%
30-34	20.4%	1.6%	20.9%	1.6%	8.2%	6.5%
35-39	15.6%	0.9%	16.0%	1.0%	6.1%	3.2%
40-44	7.8%	0.7%	8.0%	0.7%	3.2%	1.8%
45-49	7.9%	0.4%	8.1%	0.4%	3.0%	1.2%
50-54	4.1%	0.4%	4.2%	0.4%	1.7%	1.5%
55-59	5.9%	0.4%	6.0%	0.4%	2.3%	2.3%
60-64	3.3%	0.3%	3.4%	0.3%	1.3%	0.9%
65-69	1.4%	0.3%	1.4%	0.3%	0.7%	1.5%
70-74	4.0%	0.0%	4.1%	0.0%	1.4%	0.0%
75-79	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
80+	9.4%	0.0%	9.7%	0.0%	3.3%	0.0%

Sources: California Board of Registered Nursing license records, FY 2009-2010; Bureau of Health Professions, 2010; US Bureau of Labor Statistics, 2009; California Employment Development Department, 2010.

Exhibit 9. Number and age distribution of RNs changing status from inactive to active license status, 2009-2010

Age Category	Number	Percent	Age Category	Number	Percent
<30	2	0.3%	55-59	86	14.6%
30-34	9	1.5%	60-64	76	12.9%
35-39	22	3.7%	65-69	81	13.8%
40-44	33	5.6%	70-74	76	12.9%
45-49	48	8.2%	75+	84	14.3%
50-54	71	12.1%	Total	588	100.0%

Source: California Board of Registered Nursing license records, FY 2009-2010.

<u>Movements from lapsed to active license status</u>

The BRN provided data on the number and age distribution of RNs whose licenses were lapsed and later were reactivated. In the 2009-2010 fiscal year, 922 RNs living in California reactivated their licenses. The rate of reactivation was computed by dividing the number of RNs reactivating their licenses in each age group by the total number of actively licensed RNs in the age group. These data are presented in Exhibit 10.

Exhibit 10. Number and rate of RNs reactivating lapsed licenses, 2009-2010

Age Category	Number of reactivated licenses	Population of Active RNs	Rate of reactivation
<30	17	24,444	0.07%
30-34	57	28,910	0.20%
35-39	82	35,189	0.23%
40-44	111	37,045	0.30%
45-49	105	33,136	0.32%
50-54	140	39,547	0.35%
55-59	151	45,956	0.33%
60-64	111	33,980	0.33%
65-69	78	19,135	0.41%
70-74	44	8,568	0.51%
75+	22	4,829	0.54%

Source: California Board of Registered Nursing license records, FY 2009-2010.

Migration out of California (to another state or country)

Estimates of migration out of California were created with data from the 2008 NSSRN and California BRN records of nurses requesting outgoing endorsement. The first estimate is based on analysis of the 2008 NSSRN data. The same variables used to calculate migration of RNs into California were used to calculate the high estimate of migration out of California. First, estimates of the number and age distribution of RNs who moved out of California between 2007 and 2008 were computed. Then, the number and age distribution of RNs who resided in California in 2007 were tabulated. Finally, for each age category, the estimated share of RNs who moved out of California between 2007 and 2008 was calculated by dividing the number who moved out of California by the total number in California in 2007.

Two additional estimates were obtained from BRN records on applications for outgoing endorsements in 2009-2010, by age group. Some of these people requesting outgoing endorsement had in-state addresses at the time of the request, and others had out-of-state addresses. Both of these numbers were divided by the numbers of RNs in each age group in 2011 to obtain estimates of the rate of out-migration. Exhibit 11 presents the rates used in the model. The “best estimate” is the average of the three estimated out-migration rates.

Movements from active to inactive or lapsed license status

Estimates of the rate at which actively-licensed RNs allow their licenses to lapse were computed from California BRN license records and the NSSRN. These estimates are very important to the model because they measure the loss of nurses due to relocation, change in employment plans, retirement, and death. The model does not distinguish among these reasons for allowing a license to lapse.

Exhibit 11. Estimated annual rates of RNs migrating out of California.

Age Category	NSSRN estimate	BRN estimate – CA addresses	BRN estimate – all addresses	Best estimate 2011	Best estimate 2009
Under 25	0.0%	1.9%	50.4%	25.2%	6.8%
25-29	13.9%	2.5%	6.2%	10.1%	8.3%
30-34	1.9%	3.8%	4.0%	4.0%	6.6%
35-39	5.6%	1.1%	2.7%	4.1%	5.0%
40-44	2.4%	0.9%	2.1%	2.2%	2.9%
45-49	2.2%	0.9%	2.5%	2.4%	2.7%
50-54	1.2%	0.8%	1.8%	1.5%	2.0%
55-59	2.1%	0.6%	1.0%	1.6%	1.4%
60-64	2.0%	0.5%	0.5%	1.3%	2.4%
65-69	1.9%	0.3%	0.2%	1.1%	1.8%
70-74	1.5%	0.2%	0.0%	0.8%	0.3%
75-79	0.0%	0.1%	0.1%	0.1%	0.2%
80+	0.0%	0.0%	0.0%	0.0%	0.0%

Source: California Board of Registered Nursing license records, FY 2009-2010; Bureau of Health Professions, 2010.

The BRN provided data on the number of RNs with California addresses who changed their license status to inactive or allowed their license to lapse in the 2009-2010 fiscal year. These data were provided in age groups up through “75 and older”. The number of RNs with a non-active license divided by the number of current active RNs to produce initial estimates of the rate at which nurses leave the pool of actively licensed RNs.

The 2004 and 2008 NSSRN were used to obtain an alternative estimate of movements from active to inactive license status, and to obtain estimates for age groups through 65 and older. First, the number of RNs who were U.S. residents in 2004 was calculated, by age category. The number of RNs (U.S. residents only), by age category, who responded in the 2008 survey that they received their first U.S. license between 2004 and 2008 was added to this figure. Then the number of RNs who were U.S. residents in 2008, by age category, was calculated for age categories four years older than those tabulated in 2004. The formula for estimating the number going “inactive” is:

Number of inactive RNs (US residents only) = Number of RNs in 2008 – Number of RNs in 2004 – Number newly licensed between 2004 and 2008.

The rate of inactivation is:

Inactive Rate=Number of inactive RNs (US residents only) / Number of RNs in 2008

This calculation was translated into a yearly rate with the following formula:

Yearly Rate = 1-(1-Inactive rate)$^{0.25}$

If the estimated rate from the NSSRN was negative, it was assumed to be zero. For nurses under 65 years old, the average of the BRN-based estimate and the NSSRN-based estimate was used to compute the rate at which nurses’ licenses go inactive or lapse. For nurses

80 years and older, the NSSRN estimate was averaged with the BRN estimate for the 75-79 age group. Exhibit 12 presents the rates used in the supply model.

Exhibit 12. Estimated annual rates of RNs changing from active to inactive or lapsed license status, by age category.

Age Category	BRN Estimate	NSSRN Estimate	Best Estimate 2011	Best Estimate 2009
<30	0.04%	0.00%	0.02%	0.37%
30-34	0.10%	0.00%	0.35%	1.10%
35-39	0.14%	0.00%	0.07%	0.45%
40-44	0.15%	0.01%	0.08%	0.39%
45-49	0.20%	1.33%	0.76%	0.43%
50-54	0.30%	2.70%	1.50%	0.41%
55-59	0.50%	4.79%	2.64%	0.89%
60-64	0.99%	6.20%	3.60%	3.19%
65-69	2.71%	12.91%	7.81%	7.32%
70-74	4.81%		8.86%	10.13%
75-79	6.81%		9.86%	13.85%
Over 79			9.86%	17.66%

Sources: California Board of Registered Nursing license records, 2009-2010; Bureau of Health Professions, 2010.

Supply Forecasts of California's RN workforce

To create a forecast of the total number of RNs with active licenses in California, the model assumes that one-fifth of RNs in each age category moves into the next age category every year after 2011. In this manner, the workforce is "aged." For the 80 years and older category, 100% of the previous year remains and 20% of those 75 to 79 years older in the previous year enter. For each age category, the basic formula is:

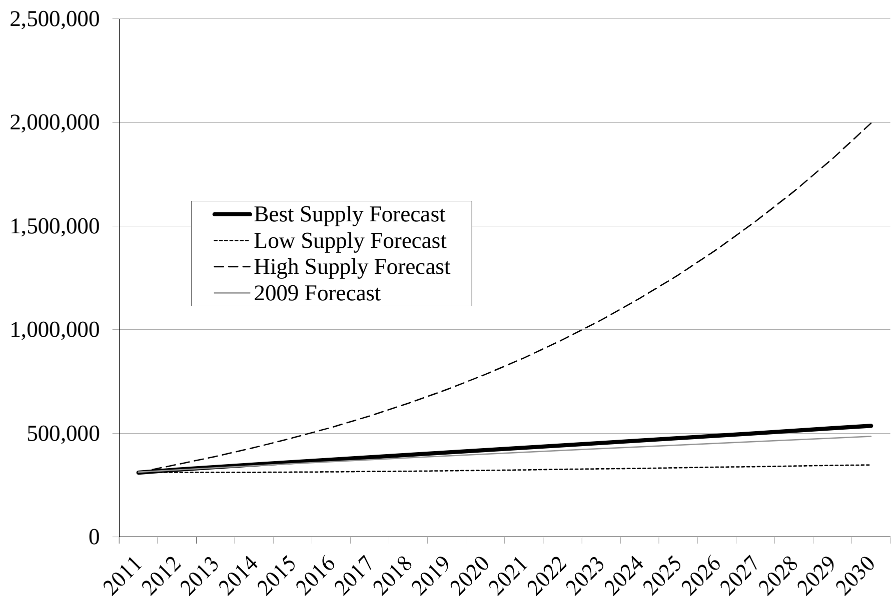
Forecasted Supply of CA RNs = Current supply of RNs as of 2011 + Estimated total inflows – Estimated total outflows.

This formula is used to produce a forecast of the total active RN population residing in California through 2030.

We estimate that California will have 526,486 active resident RNs by 2030, as shown in Exhibit 13. This is a large increase as compared with the 2009 estimate of 487,673 RNs by 2030. This difference is largely due to continuing increases in RN graduations and changes in interstate migration of nurses. The number of graduates per year is estimated to be higher in 2010-2011 and 2011-2012 than it was for the 2009 forecast, and these graduates are somewhat younger than they were in 2009. The state's RN supply is further augmented by nurses moving from other states, and these variables indicate more in-migration than in the 2009 forecasts.

As noted above, there was a range of plausible estimates for several inflow and outflow parameters of the model. Different sources of data provided different estimates of migration to California, migration from California, changes from active to inactive license status, and the projected number of new nursing graduates. Exhibit 13 presents the range of supply estimates that result when the highest and lowest possible supply forecasts are calculated. The parameters underlying the highest forecast are likely implausible, and the rapid growth of the RN workforce in the high forecast is largely driven by a very high rate of migration to California from other states. Nonetheless, these forecasts are useful to provide a sense of the range of possible supply outcomes that could occur given potential changes in any or several of the variables identified above.

Exhibit 13. Forecasted number of RNs with active licenses residing in California, 2011-2030.



The forecasted number of RNs with active licenses does not account for the variation in hours worked by RNs and the fact that some RNs with active licenses do not work in nursing; Using data from the 2010 BRN Survey of RNs, the proportion of RNs living in California with active licenses that are employed in nursing was estimated for each age category. The estimates range from 95% of RNs aged 39 to 39, and 24.2% of RNs 80 years and older. Employment rates in 2010 were generally higher for nurses age 40 years and older, and lower for younger RNs. This change in employment likely reflects the lower availability of jobs for recently-graduated RNs (Bates, Keane, & Spetz 2011); if enough jobs were available, younger RNs would probably be employed at a rate similar to 2008. The low estimate of the employment rate is the lower of the 2008 and 2010 employment rates for each age group, and the high estimate is the higher of these rates. The best estimate is the average of the low and high rates.

In the supply model, to account for variation in hours worked by RNs, the 2010 BRN Survey of RNs was used to estimate the average usual hours worked per week in all nursing jobs, for each age category, by active RNs who reside in California and were employed in nursing. These estimated hours per week are divided by 40 to obtain the average full-time equivalent employment (FTEE) for each age category. The data used for this calculation is presented in Exhibit 14. As with the estimates of the employment rate, the high estimate is the higher of the number of hours worked in 2008 and 2010, and the low estimate is the lower of these two. The best estimate is the average of the high and low estimates.

Exhibit 14. Employment rates and average hours worked per week by RNs residing in California, 2010

Age Category	Share Employed, 2010	Average Hours per Week, 2010	Share Employed, 2008	Average Hours per Week, 2008
Under 25	79.2%	32.8	100.0%	47.1
25-29	91.3%	36.1	97.4%	35.8
30-34	93.2%	34.9	95.5%	36.6
35-39	94.7%	36.3	95.2%	36.2
40-44	92.4%	36.2	89.7%	36.6
45-49	92.3%	37.2	93.4%	37.3
50-54	91.7%	37.0	89.8%	37.6
55-59	87.8%	36.5	87.2%	36.7
60-64	81.4%	35.7	75.5%	35.3
65-69	49.8%	32.2	65.2%	33.4
70-74	43.5%	27.6	42.6%	24.0
75-79	27.9%	13.1	36.0%	24.5
80 or older	25.0%	28.5	23.3%	31.1

Source: Spetz, Keane, and Herrera, 2011, BRN 2010 Survey of Registered Nurses.

Exhibit 15 presents projected high, low and best estimates of FTEE supply, based on the best estimates of the future count of RNs. The 2011 forecast is slightly higher than that of 2009, reflecting the potential for higher rates of employment of older nurses in the future.

The supply forecasts and U.S. Census Bureau projections of total population in the state can be used to calculate the number of full-time equivalent employed RNs per 100,000 people in the population for the years 2011 through 2030 (Exhibit 16). The calculation method is comparable to that used by the federal government, and based on data from the NSSRN (Bureau of Health Professions, 2010). The report summarizing the 2008 NSSRN estimates that there was a median of 786 FTEE RNs per 100,000 US residents in 2008, and 542 FTEE RNs per 100,000 in California. The national average was 746 FTEE RNs per 100,000. California's estimated rate for 2011 was 626 RNs per 100,000, based on the 2011 BRN license files and 2010 Survey of Registered Nurses. The supply model presented here predicts that California's RN-per-100,000 ratio will rise to 685 by 2015 and to 867 by 2030.

Exhibit 15. Forecasted full-time equivalent supply of RNs, based on "best estimate" forecasted count of RNs, 2011-2030.

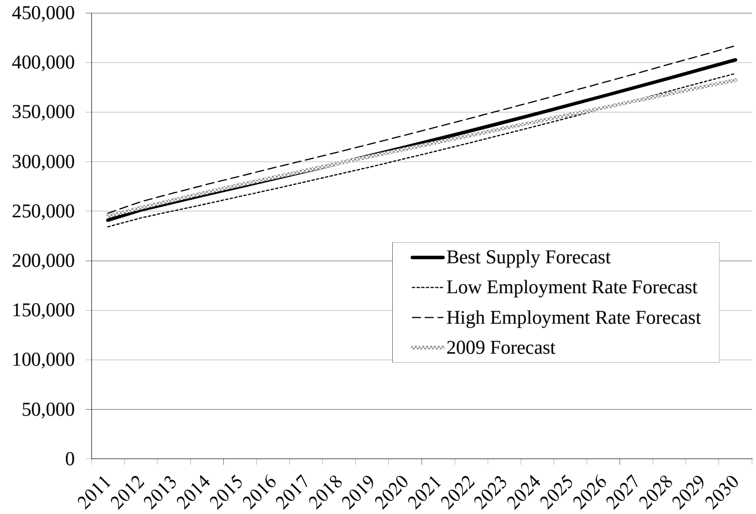
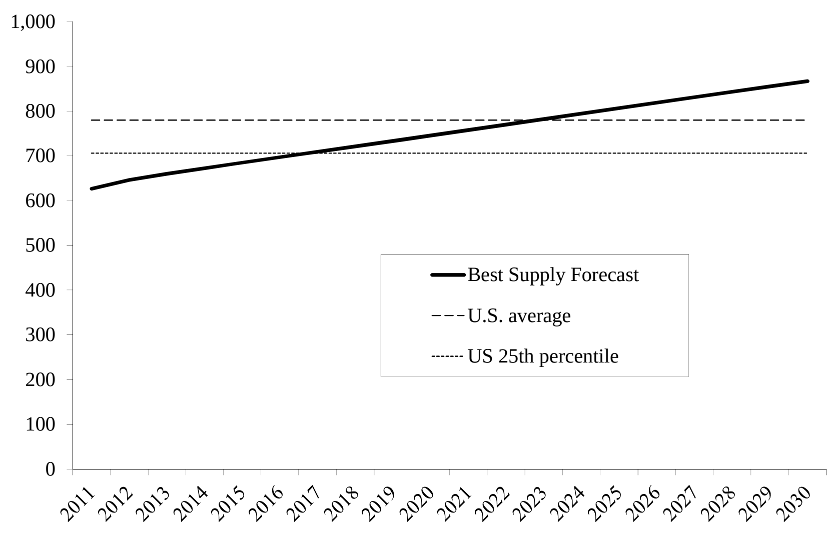


Exhibit 16. Forecasted full-time equivalent supply of RNs per 100,000 population, 2011-2030



The Demand for RNs

The demand for RNs can be measured and forecasted in many ways, reflecting disparate notions of what demand is or should be. Many policymakers and health planners consider population needs as the primary factor that should dictate the need for health care workers. For example, the World Health Organization has established a goal of countries needing a minimum of 2.28 health care professionals per 1,000 population, in order to achieve the goal of 80 percent of deliveries being attended by a skilled birth attendant (WHO 2006). Similarly, policymakers could target a stable number of nurses per capita, based on the current number of nurses per capita, a target developed by an expert panel based on review of health needs and the role of nurses in meeting those needs, or a goal based on comparisons with other U.S. states.

It is important to recognize, however, that population need is not the same thing as economic demand. Nurses and other health professionals are not free, and the cost of employing them must be weighed against other uses of resources. A nurse employer might want to hire more nurses but may not have sufficient income from its patient care services to afford more nurses. An employer might have resources that could be used to hire more nurses, but might think that investment in an electronic medical record will produce more value to patients. The demand for nurses is essentially derived from economic forces, which may not be aligned with population needs.

For this report, several different measures of demand (or need) are considered, in order to develop a range of plausible estimates of future demand for RNs. The approaches used are:

- Fixed benchmarks based on current RN-to-population ratios in California
- Fixed benchmarks based on U.S. RN-to-population ratios
- An employment forecast published by the California Employment Development Department for 2018
- Demand forecasts based on 2006 employment in hospitals and future population growth and aging

These approaches are informed by a survey of RN employers conducted in fall 2010, and by Massachusetts's experience after implementation of its statewide health insurance reform. The Massachusetts health insurance reform is similar in many ways to the Patient Protection and Affordable Care Act (PPACA), and thus may help predict how PPACA will affect RN demand.

Forecasts based on RNs per capita

One frequently-used benchmark of the need for RNs is the number of employed RNs per 100,000 population (California Institute for Nursing and Health Care, 2006). This metric is reported by the BHPr in the NSSRN report (Bureau of Health Professions, 2010). For over ten years, California has had one of the lowest ratios of employed RNs-per-100,000 population in the United States and ranked 48th in 2008. Many policy advocates have supported efforts to move California's full-time equivalent employment of RNs toward the 25th percentile nationwide (706 RNs per 100,000) or even the national average (746 RNs per 100,000). These benchmarks were compared with the current and forecasted population of California (California Department of Finance, 2009) to project need for RNs to remain at current FTEE RN-to-population ratios, to reach the 25th national ratio, and to attain the national average ratio.

Forecasts based on hospital staffing of RNs per patient day

The main shortcoming of targeting a fixed number of RNs per population is that the target is arbitrarily defined. The current number of nurses per capita may not be a large enough number to deliver health care needs, and if there is a shortage of nurses, the number may not be as large as economic demand. Likewise, a target number based on a national average or other source might not reflect the unique population and health care system of California. An additional shortcoming is that fixed nurse-to-population ratios do not account for increases in the demand for health services associated with population aging. However, this approach has the benefit of being easy to understand and adjust, and provides a clear indication of how California's supply compares to national levels of supply.

A second approach to forecasting demand for RNs uses current hospital utilization and staffing patterns to estimate future demand. First, the number of hospital patient days per ten-year age group was obtained from the OSHPD Inpatient Hospital Discharge Data for 2006, for short-term acute-care hospitals (Office of Statewide Health Planning and Development, 2008).[2] Then, age-specific population forecasts were gathered from the California Department of Finance (2009). Dividing 2006 patient days by 2006 population provides the number of patient days per population, per age group. These rates of patient days can be applied to future population projections to get forecasts of patient days by age category. To produce forecasts of hospital demand for RNs, RN hours per patient day were obtained from OSHPD's Hospital Annual Financial Data for 2006-2007 (Office of Statewide Health Planning and Development, 2008). Average RN hours per patient day in 2005 were 10.55. Multiplying the RN hours per patient day figure of 10.55 by the patient day forecasts produces a forecast of RN hours needed in the future. To equate these hours to FTEEs, RN hours are divided by 1768 (average annual productive hours per FTE).

The calculations described above provide demand forecasts for only one type of employer (hospitals). In order to extrapolate these forecasts across all employment settings, they were compared with other known estimates of RN employment. First, EDD's estimate of the number of RN jobs in 2008 were used as a calibration, estimating that 45.4 percent of jobs were in the short-term acute-care hospitals that reported to OSHPD. Second, the BRN 2010 survey was used to calibrate against the OSHPD data, indicating that 41 percent of jobs were in these hospitals. The EDD-based estimates forecast there will be 300,251 FTEE positions for nurses in 2030, while the BRN-based estimates indicate there will be 332,521 positions.

Employment Development Department forecasts

The most recent projections by the EDD indicate that there will be 297,200 registered nurse jobs in California by 2018 (California Employment Development Department, 2010). The EDD forecast does not distinguish between full-time and part-time jobs. To estimate the FTEE employment implied by the EDD forecasts, we use the adjustment of 0.9, which is the average number of hours worked per week by California RNs (36) divided by 40. The FTEE forecast for 2018 is thus 267,480.

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[2] The age groups are under 1, 1-9, 10-19, 20-29, 30-39, 40-49, 50-59, 60-69, 70-79, and 80 and older.

Adjusting for low demand due to economic recession

The above-described forecasting methods can be useful in considering long-term trends in demand, but do not account for the impact of the economic recession on demand, and the potential impact of economic recovery. Since January 2008, the United States has been mired in a deep recession. In fall 2010, a survey of nurse employers was conducted, and found that nearly half of the responding hospitals found that demand was less than supply, and another 11.3 percent thought demand and supply were in balance (Bates, Keane, & Spetz 2011). Respondents expected employment of RNs to increase 4.4 percent between 2010 and 2011, and 1.1 percent between 2011 and 2012. These growth rates are higher than those calculated from the forecasts based on expected patient days (3.6% total from 2010 to 2012), and suggest that in 2012 there might be 2,000 more hospital-based positions than forecasted. This represents less than 1 percent variation in the forecasts, and thus adjustments are not made to the demand forecasts based on the employer survey.

Accounting for PPACA

The implementation of PPACA is expected to increase access to health insurance, and likely will increase demand for health care services (Coffman and Ojeda, 2010). In particular, growth in demand for primary care services is expected to be more rapid, as well as for other professionals whose work supports primary care, such as laboratory technicians who provide diagnostic tests and pharmacists. A recent analysis of health care employment in Massachusetts found that employment grew about 8 percent over a five-year period prior to implementation of that state’s health insurance reform, and 9.5 percent over nearly a five-year period afterward (Staiger, Auerbach, & Buerhaus 2011). However, most of this growth was in administrative positions; employment of health care professionals grew 2.8 percent in Massachusetts between 2005-2006 and 2008-2009, while it grew 5.9 percent in the rest of the United States.

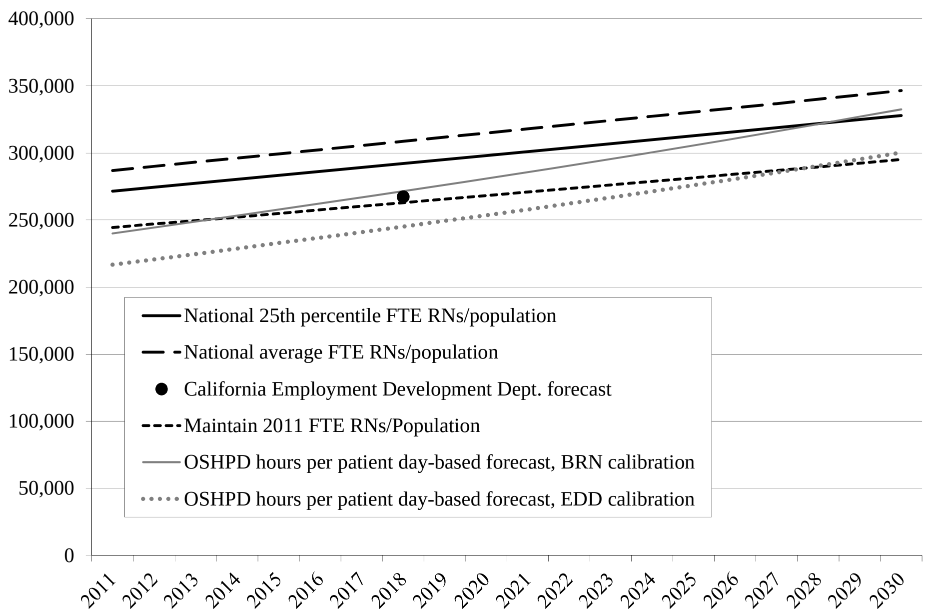
It is unclear how PPACA might affect the demand forecasts for RNs in California. Most registered nurses do not provide primary care services, and thus the main area of anticipated growth in demand may not impact them as much as other health professionals. Nurse practitioner demand may rise, but only 3.4 percent of RNs have the job title of NP (Spetz, Keane, & Herrera 2011), and thus growth in their demand will have little effect on overall RN demand. RN positions could rise more rapidly than in Massachusetts because Massachusetts had a relatively good supply of health professionals in advance of their implementation of health insurance reform, and thus their system may have been able to absorb increased demand for services easily. In California, more health professionals may be needed to meet the higher demand for health services.

The evidence suggests that PPACA is likely to impact primary care professionals more substantially than other health professionals, and may have no impact on employment growth for any health professionals. Thus, it seems likely that PPACA will have little to no impact on demand for RNs, and the demand forecasts presented here are not adjusted to account for any potential impact of PPACA.

Comparing the demand forecasts

Exhibit 17 compares all aforementioned demand forecasts of full-time equivalent RNs. The forecasts estimate that the FTEE demand for RNs in 2011 ranged from 216,724 to 244,427. Demand in 2030 is forecasted to be between 295,098 and 346,479. These lower figures are not likely to accurately represent total future demand, because they do not account for additional demand caused by future population growth and aging. The EDD forecast for 2018 is lower than that produced by targeting the national 25th percentile of RN-to-population ratios, and slightly higher than that calculated from estimated future patient days.

Exhibit 17. Forecasted full-time equivalent demand for RNs, 2011-2030.



Comparing Supply and Demand for RNs

Through most of the 2000s, there was a widespread perception that California faced a significant long-term shortage of RNs, and forecasts published by the BRN were consistent with this perception. Since the 2005 forecasts were published, yearly RN graduations have more than doubled. The forecasts published in 2009 reflected part of this improvement in RN graduations, and indicated that California was closing the gap between RN supply and demand. The rapid onset of the economic recession that began in December 2007 has led to concerns that RN supply is now greater than demand, although in the long term another RN shortage could emerge.

Exhibit 18 presents two supply forecasts and two demand forecasts. The supply forecasts are the "best" forecast, which assumes that future interstate migration of RNs is higher than today but not as high as in 2007-2008, and the "low" forecast, which assumes that interstate migration of RNs is biased towards nurses leaving California. The demand forecasts are based on future patient days, and also the benchmark of California reaching the 25th percentile of nationwide FTE RNs per 100,000.

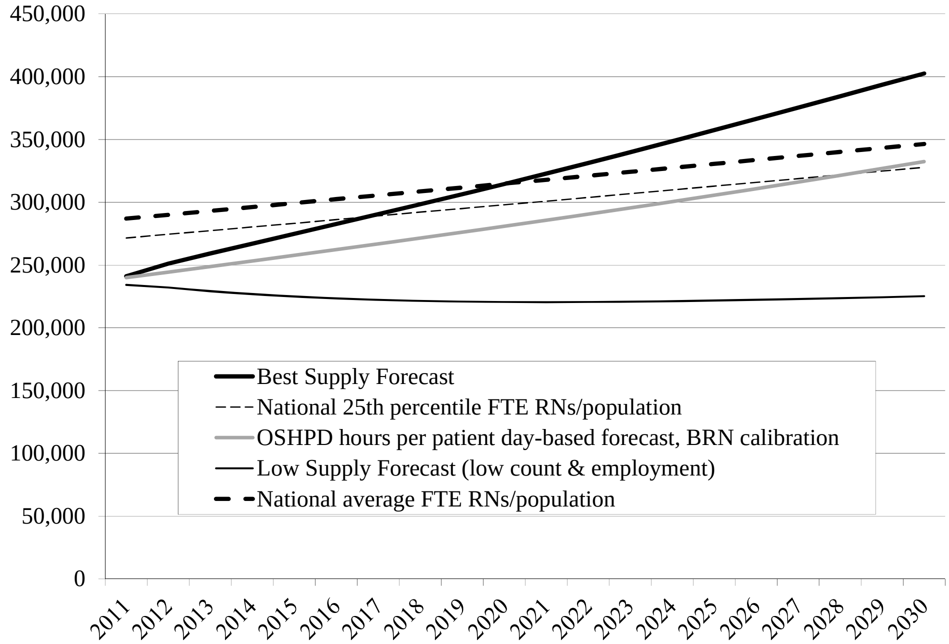
The best estimate is that in 2011 there were 241,009 FTE RNs available to work, and the patient days-based estimate is that there are 240,017 positions to be filled. This suggests a small surplus of RNs in 2011 – which is consistent with reports that the shortage of the 2000s has ended.

In the long-term, the best supply forecast predicts that nurse supply will rise more rapidly than California's population as a whole, and RN supply will surpass the national 25th percentile of FTE RNs per 100,000 by 2018. Supply is forecasted to grow substantially more rapidly than the demand estimate based on hospital utilization. However, the low estimate of supply indicates that it is possible that California enters another period of RN shortage soon, and such a shortage could persist for decades. Which scenario prevails will depend on a number of factors:

- Whether RN graduations are sustained at the current level or increase
- Whether inter-state migration leads to more nurses entering California than leaving
- Whether older RNs continue to work at higher rates than in the past
- Whether younger RNs are able to work at rates similar to 2008, rather than the low rates of 2010

It is likely in the short run that more nurses will leave California than will enter, and if a surplus persists, then out-migration will prevail in the long term. Whether older RNs will continue to work at a higher rate than in the past and younger RNs will find jobs in California depend on the rate of economic recovery.

Exhibit 18. Forecasted full-time equivalent supply of and demand for RNs, 2011-2030.



Comparison of the 2011 Forecasts with Previous Forecasts

The forecasts presented here use a similar methodology to that used previously by Coffman, Spetz, Seago, Rosenoff, and O'Neil (2001), Spetz and Dyer (2005), Spetz (2007), and Spetz (2009). The magnitude of the projected shortage changed dramatically between the 2005 and 2007 forecasts. In 2005, the estimated shortage ranged between 6,872 and 21,161 RN FTEs; in 2007, the shortage was estimated to be at least 10,294 RN FTEs. However, while the 2005 forecasts predicted that the shortage would worsen continuously, reaching up to 122,223 FTEs by 2030, the 2007 forecasts predicted that the shortage will improve, and California would surpass the national average of RN FTEs per 100,000 population (825) by 2022. The 2009 forecasts were similar to those of 2007, although California was not anticipated to reach the national average of RN FTEs per 100,000 population until 2025. The 2011 forecasts indicate that supply will rise more rapidly than estimated in 2009, and that California will surpass the national average of RN FTEs per 100,000 population by 2020.

Policy Implications

The 2005 forecast report advised that "The only plausible solution to the RN shortage, based on our preliminary analyses, appears to be continued efforts to increase the numbers of graduates from California nursing programs." This recommendation was acted upon by state leaders. Significant increases in state funding for expanded educational capacity of nursing programs, increased funding for equipment, use of updated instructional technologies, and other needed educational resources have had a favorable impact on addressing the RN shortage in California. Between 2004-2005 and 2009-2010, nursing graduations increased 72 percent, reaching over 11,500 new RN graduates per year. The new forecasts indicate that this number of graduations per year appears more than sufficient to meet future RN demand.

Policymakers should be cautioned that the 2011 BRN forecasts represent long-term forecasts and are not intended to reflect rapidly changing economic and labor market conditions. They also are based on the most currently available data; the factors that affect RN supply and demand are unlikely to remain static. The most important possible changes include: (1) the number of graduations from RN education programs; (2) inter-state migration; and (3) employment rates of older RNs. These factors and any other potential influences on California's nursing shortage, such as the limited pool of faculty, limited availability of clinical education placements, and faculty salaries that are not competitive with clinical practice positions, should be monitored continuously.

California leaders should observe closely the employment paths of recent nursing graduates who are entering a difficult job market and may choose to leave the nursing profession or leave California. Moreover, they should watch new enrollments in nursing programs, which could drop as state colleges and universities face tight budgets and as potential students hear there might not be enough nursing jobs. California will likely need to maintain the present number of nursing graduates in order to meet long-term health care needs.

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Acronyms

BHPr – Bureau of Health Professions, part of the Health Resources and Services Administration in the U.S. Department of Health and Human Services

BRN – California Board of Registered Nursing

BLS – U.S. Bureau of Labor Statistics

CA – California

DOF – California Department of Finance

EDD – California Employment Development Department

FTE – Full-time Equivalent

FTEE – Full-time Equivalent Employment

NCLEX-RN – National Council Licensure Examination – Registered Nurses (NCLEX is a registered trademark and/or servicemark of the National Council of State Boards of Nursing, Inc.)

NSSRN – National Sample Survey of Registered Nurses

OSHPD – California Office of Statewide Health Planning and Development

RN – Registered Nurse

UCSF – University of California San Francisco