Understanding & Using HRSA’s New Nursing Supply & Demand Model

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U.S. Department of Health and Human Services

In 2004, HRSA released projections of RN supply and demand

These projections provide an estimate or a forecast of the future RN and LPN nursing workforce.

Less emphasis should be placed on the projected supply and demand numbers, and instead focus more on the factors that have been identified as influencing the growth and reduction of the nursing workforce.
Nursing Model

- Microsimulation model assumptions
  - Supply equals demand at baseline
  - Future production of nurses remains consistent with the current rate
  - Nurses practice in the state where they were trained
  - Current delivery systems

- Supply components
  - New entrants
  - Attrition
  - Average work hours

- Demand components
  - Changing demographics
  - ACA – number of insured
Key Findings

National Findings
- Supply of both RNs and LPNs will exceed demand in 2025.
- RN and LPN supply is expected to grow by 952,000 FTEs and 260,900 FTEs respectively.
- RN and LPN demand is expected to grow by 612,000 FTEs and 201,000 FTEs respectively.

State Level Findings
- Distributional imbalances exist
- State shortages / surpluses
Alternative Scenarios

- Combination of 10% decrease in graduation rates and early retirement (2 years)
  - Shortfall of 86,000 RNs

- Adjusting number of new graduates to approximately 126,000 to 133,000 per year
  - Supply and demand balanced
Implications

- Adequate supply of nurses to meet the increased numbers of individuals receiving care due to the ACA.
- Greater flexibility to fill expanding roles.
- Greater need to focus on distribution and diversity of the RN and LPN workforce.
- HRSA’s investments in Nursing programs.
Conclusions

- Projections are a planning tool for nursing leaders.
- Supply and demand will continue to be affected by numerous factors including population growth and the aging of the nation's population, overall economic conditions, aging of the nursing workforce, and changes in health care delivery and reimbursement.
- HRSA will refine the health workforce projection models on a regular basis to continue to assess the impacts on the nursing workforce.
- Next set of projections is expected to be released in 2016.
- Nursing web-based model is expected to be live in summer 2015.
Contact Information

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Understanding HRSA’s 2012-2025 Supply & Demand Nursing Projections

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Grand Hyatt Denver
Denver, Colorado
Historical Background on HRSA Workforce Modeling

- Siloed models (separate models for different occupations)
- Different contractors built different models using different platforms, methods and assumptions
- Static models—parameters constant over time and across states
- Separate supply and demand models
- Infrequently updated
- Limited capability to analyze policy or emerging care delivery models
- Limited ability to capture geographic variation in population risk factors

Before

Nursing Supply Model ● Nursing Demand Model ● Physician Supply Model ● Integrated Requirements Model ● Pharmacist Supply and Requirements Model ● Dental Requirements Model ● General Services Demand Model ● other misc. models

Now

Health Workforce Simulation Model
Health Workforce Simulation Model: Design Criteria

- Built on solid theoretical underpinnings
- Dynamic model that can integrate professions and link supply with demand
- Can account for both current and future availability of data
- Can be adapted for analysis at state or local levels
- Easy to maintain/update as new data becomes available
- Can model a wide range of scenarios—reflecting uncertainties in future trends
Conceptual Model, Methods and Data for Projecting Nursing Workforce Demand

HWSM version
Conceptual Model for Projecting Workforce Demand

Utilization Patterns
Relationship between patient characteristics and health care use (MEPS, NIS)

Population Database
Demographic, socioeconomic, & health risk factors (ACS, Census Bureau Projections)

Demand for Services

Hospital
- Inpatient Days By diagnosis category
- Emergency Visits By diagnosis category

Ambulatory
- Provider Office Visits By occupation/specialty
- Outpatient Clinic Visits By occupation/specialty
- Dentist Office Visits By occupation/specialty

Post-acute/Long Term
- Nursing Facilities (population age 75+)
- Residential Care (population age 75+)
- Home & Hospice Visits By occupation

Other Employment
- Public (total population)
- School Clinic (population age 5-17)
- Academia (new graduates entering occupation/specialty)
- All other (total population)

Staffing Ratios
By occupation/specialty & setting

Demand for Health Workers
By occupation/specialty and setting
- Physicians
- Advance practice nurses
- Physician assistants
- Nurses
- Oral health
- Rehabilitation
- Pharmacy
- Respiratory care
- Therapy
- Behavioral health
- Dietary and nutrition
- Diagnostic laboratory
- Diagnostic imaging
- Vision and hearing
- Direct care professions
Microsimulation Approach for Modeling Workforce Demand

• Individual patients are the unit of observation
  o Predict use of health care services by individual
  o Determine how care will be provided to individuals
  o Sum across individuals to produce aggregate statistics

• Approach
  o Develop population health database with health profile for representative sample of the population
  o Develop predictive equations (using regression analysis) to model health care use

• Translate health care encounters into demand for practitioners
  - Use data on how practitioners divide their time between care delivery settings and patient encounters to create estimates of patient encounters per full time equivalent
Care Delivery Patterns: Converting Service Demand to Health Profession FTEs

- Estimate current number of nurses by care delivery setting
- Estimate current national use of care by delivery setting
- Divide care use by number of nurses to estimate use-per-nurse ratios
- Implicit assumption that supply & demand roughly in equilibrium nationally

### Nursing Workload Drivers by Work Setting

<table>
<thead>
<tr>
<th>Work Setting</th>
<th>Workload Driver</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hospital inpatient</td>
<td>Inpatient days</td>
</tr>
<tr>
<td>Emergency</td>
<td>Emergency visits</td>
</tr>
<tr>
<td>Offices</td>
<td>Office visits</td>
</tr>
<tr>
<td>Outpatient</td>
<td>Outpatient visits</td>
</tr>
<tr>
<td>Home health</td>
<td>Home health visits by a nurse</td>
</tr>
<tr>
<td>Government</td>
<td>Overall population</td>
</tr>
<tr>
<td>Nursing care facilities (skilled/long term)</td>
<td>Population age 75 and older</td>
</tr>
<tr>
<td>Residential care facilities</td>
<td>Population age 75 and older</td>
</tr>
<tr>
<td>Nurse education</td>
<td>Nurses educated</td>
</tr>
<tr>
<td>School health</td>
<td>Population age 5 to 18</td>
</tr>
<tr>
<td>Other</td>
<td>Overall population</td>
</tr>
</tbody>
</table>
### Distribution (%) of Nurses Across Employment Settings

<table>
<thead>
<tr>
<th>Work Setting</th>
<th>RNs OES</th>
<th>RNs 2008-10 ACS</th>
<th>RNs 2008 NSSRN</th>
<th>LPNs 2008-10 ACS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2012</td>
<td>2010</td>
<td>2008 ACS</td>
<td>2008 NSSRN</td>
</tr>
<tr>
<td>Hospitals</td>
<td>62.0</td>
<td>60.4</td>
<td>63.2</td>
<td>62.2</td>
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<tr>
<td>Inpatient</td>
<td>55.6</td>
<td>54.1</td>
<td>56.6</td>
<td>55.7</td>
</tr>
<tr>
<td>Emergency</td>
<td>6.4</td>
<td>6.3</td>
<td>6.6</td>
<td>6.5</td>
</tr>
<tr>
<td>Offices</td>
<td>7.4</td>
<td>9.8</td>
<td>5.1</td>
<td>10.5</td>
</tr>
<tr>
<td>Outpatient</td>
<td>4.0</td>
<td>4.5</td>
<td>4.6</td>
<td>5.7</td>
</tr>
<tr>
<td>Home health</td>
<td>6.2</td>
<td>5.5</td>
<td>3.8</td>
<td>6.4</td>
</tr>
<tr>
<td>Government</td>
<td>5.6</td>
<td>5.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nursing care facilities (skilled/long term)</td>
<td>5.3</td>
<td>5.1</td>
<td>7.4</td>
<td>5.3</td>
</tr>
<tr>
<td>Residential care facilities</td>
<td>1.7</td>
<td>1.6</td>
<td>0.4</td>
<td>1.3</td>
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<tr>
<td>Nurse education</td>
<td>3.1</td>
<td>1.2</td>
<td>0.6d</td>
<td>3.8</td>
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<tr>
<td>School health</td>
<td>1.9</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Social work</td>
<td>0.7</td>
<td>0.7</td>
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<tr>
<td>Public/community health</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>2.2</td>
<td>5.4</td>
<td>14.9</td>
<td>3.9</td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>100</strong></td>
<td><strong>100</strong></td>
<td><strong>100</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

Sources and notes:
- a Occupational Employment Statistics.
- b 2008-2010 pooled files of the American Community Survey, reported in HRSA 2013 nursing report.
- d Nurses in teaching positions might be recorded in the ACS under teaching rather than under nursing.
- Estimated based on estimate that 89.6% of hospital nurses are working in inpatient settings and 10.4% are working in emergency settings, with nurses in administration allocated proportionately across settings (from the 2008 NSSRN).
- f Numbers might not sum to 100% because of rounding.
Annual Health Care Use per RN and LPN

- Example: every 4,469 visits to a physicians office translates to 1 full time equivalent RN
  - Notes: Estimate reflects that not all physician offices employ RNs
  - Estimate does not reflect that care provided by nurses differs within settings (e.g., in a cardiologist office versus a primary care provider office)

<table>
<thead>
<tr>
<th></th>
<th>Registered Nurse</th>
<th>Licensed Practical Nurse</th>
</tr>
</thead>
<tbody>
<tr>
<td>Office visits</td>
<td>4,469</td>
<td>15,258</td>
</tr>
<tr>
<td>Outpatient visits</td>
<td>382</td>
<td>1,065</td>
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<tr>
<td>Inpatient days</td>
<td>106</td>
<td>802</td>
</tr>
<tr>
<td>Emergency visits</td>
<td>612</td>
<td></td>
</tr>
<tr>
<td>Home Health Visits</td>
<td>63</td>
<td>246</td>
</tr>
<tr>
<td>Nursing Home Residents</td>
<td>125</td>
<td>86</td>
</tr>
<tr>
<td>School Health</td>
<td>900</td>
<td></td>
</tr>
<tr>
<td>Residential</td>
<td>389</td>
<td>2,021</td>
</tr>
</tbody>
</table>
HWSM
CONCEPTUAL MODEL AND CHARACTERISTICS OF NURSING SUPPLY
Nursing Workforce Simulation Model: Supply Component

• Simulate likely career choices of individual clinicians
  o Microsimulation—modeling workforce decisions of individual clinicians, rather than stock-and-flow models that simulate groups of clinicians

• Dynamic modeling
  o Environmental and market factors—clinicians respond to changes in the economy, healthcare operating environment, and policy
  o Shortages/surpluses affect clinician workforce decisions

• Workforce activities: what, where, how, when
  o What type of work will I do?
  o Where will I work (e.g., state of practice)?
  o How many hours will I work?
  When will I retire?
Nursing Workforce Simulation Model: Supply (cont.)

- Model process
  - Start with database containing starting supply of RNs and LPNs
  - Each year, model:
    - New entrants to the workforce
    - Attrition (retirement, mortality)
    - Other activities (labor force participation, hours worked, education, geographic mobility)
  - End of year supply = starting supply for subsequent year

- Scenarios: vary number of new graduates, retirement patterns, hours worked
Conceptual Model for Nurse Workforce Supply

Current Active Supply + New Entrants - Attrition = Future Active Supply

Workforce Participation
Hours Worked
Change in Occupation, Specialty, or Education Level
Health Workforce Simulation Model

• Designed to be easily updated
  o Annual updates from the American Community Survey, Behavioral Risk Factor Surveillance System, Medical Expenditure Panel Survey, Nationwide Inpatient Sample, Census Bureau/state population projections, etc.
  o Incorporate latest research
    – Nurse migration patterns
    – Emerging care delivery models (e.g., Accountable Care Organizations, team-based care)
    – Evolving scope of practice, changing technology
    – Economic conditions that might affect labor force participation rates
  o Recognized that individual states have more complete supply data than available at the national level
    – HRSA decision to create web-based version of the HWSM that allows states to run their own supply numbers/scenarios
    – Underscores importance of Nursing Minimum Dataset (MDS)