Louisiana’s Multi-Regional Statewide Nursing Workforce Forecasting Model

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Funded by the Louisiana Health Works Commission and the Louisiana State Board of Nursing
The Forecasting Team

Lisa Anderson, MSN, RN, VP Member Services, The Center for Health Affairs/NEONI

- 14 years with The Center
- Background as an administrator in nursing and healthcare
- Developed, implemented and managed countless projects that address healthcare workforce issues
- Operations, fiscal management, planning and development and employee management experience

Patricia J. Cirillo, Ph.D., President, Cypress Research Group

- Ph.D. in Experimental Psychology and Neuroscience
- Expertise in sampling and statistical analysis
- Developed research practice around answering questions and solving business problems using quantitative methods

Craig L. Moore, Ph.D. Private Consultant

- Ph.D. in Economics and Statistics
- Directed numerous regional economic projects
- Authored numerous articles in academic journals and dozens of studies
- Lectured and researched at leading universities

Cynthia Bienemy, Ph.D., RN

- Ph.D. in Nursing
- Director of the Louisiana Center for Nursing (Nursing Workforce Center)
- Over 32 years in Nursing as a practitioner, professor, and nurse researcher
- Conducted Louisiana’s first Nurse Demand Study

Louisiana’s Multi-Regional Statewide Nursing Workforce Forecasting Model
Meeting Objectives

Design Overview

Significant Findings

Simulations

Regional & State Model Demonstrations

Questions and Answers
The Models

One set of models for Registered Nurses (RN), Advanced Practice Registered Nurses (APRN) and Licensed Practical Nurses (LPN)

Each set of models includes 8 regional models and one statewide model for each type of nurse

Any change in a regional model is automatically reflected in the corresponding statewide model

There are a total of 27 separate models... 8 regional models and a statewide model for RNs, APRNs and LPNs

Regional models can be used independently or in concert with other regions and the corresponding statewide model

Models span 2013-2020
The Regions

- Regions were determined by considering what other data sources were available using various regional boundaries for comparison.

- Regional Labor Market Areas (RLMAs) turned out to be most compatible.
## The Regions

<table>
<thead>
<tr>
<th>Region</th>
<th>Parishes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>New Orleans (1)</strong></td>
<td>Jefferson, Orleans, Plaquemines, St. Bernard, St. Charles, St. James, St. John the Baptist, St. Tammany</td>
</tr>
<tr>
<td><strong>Baton Rouge (2)</strong></td>
<td>Ascension, East Baton Rouge, East Feliciana, Iberville, Livingston, Pointe Coupee, St. Helena, Tangipahoa, Washington, West Baton Rouge, West Feliciana</td>
</tr>
<tr>
<td><strong>Houma (3)</strong></td>
<td>Assumption, Lafourche, Terrebonne</td>
</tr>
<tr>
<td><strong>Lafayette (4)</strong></td>
<td>Acadia, Evangeline, Iberia, Lafayette, St. Landry, St. Martin, St. Mary, Vermilion</td>
</tr>
<tr>
<td><strong>Lake Charles (5)</strong></td>
<td>Allen, Beauregard, Calcasieu, Cameron, Jefferson Davis</td>
</tr>
<tr>
<td><strong>Alexandria (6)</strong></td>
<td>Avoyelles, Catahoula, Concordia, Grant, LaSalle, Rapides, Vernon, Winn</td>
</tr>
<tr>
<td><strong>Shreveport (7)</strong></td>
<td>Bienville, Bossier, Caddo, Claiborne, DeSoto, Lincoln, Natchitoches, Red River, Sabine, Webster</td>
</tr>
<tr>
<td><strong>Monroe (8)</strong></td>
<td>Caldwell, East Carroll, Franklin, Jackson, Madison, Morehouse, Ouachita, Richland, Tensas, Union, West Carroll</td>
</tr>
</tbody>
</table>
Model Characteristics and Function

Excel Platform

- Spreadsheets are connected by unique mathematical relationships within each model. Regional models are automatically linked together to form a statewide model for each type of nurse.

You control the variables

- 16 settings can be adjusted to create supply and demand simulations for policy analysis.
Supply Model

How Many Nurses We Have

Estimated from annual state licensure data

Each type of FTE nurse is projected by adjusting for hours worked by age in single years into the future.

Newly licensed nurses are added each year based on state registration data that indicates where the primary employer is located.
Demand Model

How Many Nurses We Demand

- The age, gender, and degree of urbanization of the regional and state population.
- Amount of healthcare (by setting) required by the population.
- Number of nurses required to provide each ‘unit’ of healthcare measured in FTEs.
• In each healthcare setting the number of FTE nurses of each type is determined by using projected demand in that setting divided by the number of nurses working in that setting in each region based on registration data.

• This intensity factor is checked against national norms to insure that the figures are reasonable.
### Louisiana Nurse Intensity Factors

#### Intensity Factors Based on 2012 Nurse Registration Data

<table>
<thead>
<tr>
<th>Setting</th>
<th>RN</th>
<th>LPN</th>
<th>APRN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ambulatory Visits/1,000 people</td>
<td>0.24</td>
<td>0.23</td>
<td>0.11</td>
</tr>
<tr>
<td>Emergency Visits/1,000 people</td>
<td>1.00</td>
<td>N/A</td>
<td>0.05</td>
</tr>
<tr>
<td>Home Health/1,000 people</td>
<td>0.36</td>
<td>0.23</td>
<td>0.001</td>
</tr>
<tr>
<td>Inpatient/1,000 people</td>
<td>6.91</td>
<td>1.97</td>
<td>0.72</td>
</tr>
<tr>
<td>Nursing Facilities/1,000 people</td>
<td>0.06</td>
<td>0.19</td>
<td>0.002</td>
</tr>
<tr>
<td>Community Health*</td>
<td>1.77</td>
<td>0.42</td>
<td>0.03</td>
</tr>
<tr>
<td>Nursing Education*</td>
<td>3.11</td>
<td>N/A</td>
<td>0.17</td>
</tr>
<tr>
<td>Public Health*</td>
<td>1.12</td>
<td>0.42</td>
<td>0.03</td>
</tr>
<tr>
<td>*Estimated from LA nurse</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>registrations and 2010</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>census</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Important to note that these are baseline intensity factors. The model allows these to be easily changed.
- While we can speculate if and how RN and LPN intensity factors will change, we know that APRN intensity factors will change as APRNs are used more to alleviate primary care shortage.

These will change in the next several years.
Each model is more than a forecast of the supply and demand for nursing.

Each model can simulate alternative supply and demand scenarios for policy analysis.

Each model is designed to allow for adjustments of assumptions to reflect changes in demand and supply.
How Does One *Use* The Model?

continued…

There are two types of data within the models – “soft coded” (changes which the user can easily make) and “hard coded” (changes which the user cannot easily make).

### “Soft” Coded

- Number of newly licensed nurses
- Number of nurse recruits into each region
- ‘Export rate’ (providing care to those from outside the region)
- Intensity Factors and their expected growth rates for each setting
- Population Migration of older households into a region

### “Hard” Coded

- Population demographics
- Nurse workforce demographics and work patterns that are updated each year from registration data
- The demand for healthcare services in each healthcare setting for each category of age, gender and degree of urbanization
How Does One *Use* The Model? continued…

State Model Shows You...

- Total Demand for FTE nurses
- Demand by healthcare setting
- Supply of FTE nurses by Region
- Total Supply vs. Demand
- FTEs by Region & Total (numerically & graphically)

Regional Models Show you...

- Demand Dashboard
- Demand, by Setting
- Supply Dashboard
- Supply vs. Demand

All numbers are in FTEs and extend to 2020…

Louisiana’s Multi-Regional Statewide Nursing Workforce Forecasting Model
How Does One *Use The Model?*

continued…

Results
There are regional variations in supply and demand for RNs, APRNs, and LPNs.

2013 shows a statewide shortage of 3,075 full-time equivalent (FTE) RNs.

The demand for APRNs (FTEs) in 2013 was predicted to be 5,282, with a supply of 3,959, leaving a gap of 1,323 FTEs.

There will be a shortage of LPNs through 2020 in the following RLMAs: Baton Rouge, New Orleans, and Houma.
LA Statewide Nurse Workforce 2013 (FTEs)

- Statewide, supply just about meets demand for LPNs in 2013.
- 2013 showed a significant shortage of RNs and APRNs, statewide.
- However, this differs dramatically by region.

<table>
<thead>
<tr>
<th>Number of Licensed Nurses</th>
<th>Supply</th>
<th>Demand</th>
</tr>
</thead>
<tbody>
<tr>
<td>RNs</td>
<td>41,397</td>
<td>44,472</td>
</tr>
<tr>
<td>APRNs</td>
<td>3,959</td>
<td>5,282</td>
</tr>
<tr>
<td>LPNs (Supply includes those unemployed)</td>
<td>20,852</td>
<td>20,855</td>
</tr>
</tbody>
</table>
Differences noted in demand among the regions in terms of the proportion of nurses who are RNs and LPNs.
# 2013 Demand for Nurses - Statewide Varies By Setting

<table>
<thead>
<tr>
<th>Health Care Setting</th>
<th>RNs</th>
<th>LPNs</th>
<th>APRNs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hospital Inpatient - Regional</td>
<td>25,254</td>
<td>6,436</td>
<td>2,759</td>
</tr>
<tr>
<td>Regional Exports</td>
<td>1,060</td>
<td>240</td>
<td>116</td>
</tr>
<tr>
<td>Emergency Department</td>
<td>1,706</td>
<td>-</td>
<td>88</td>
</tr>
<tr>
<td>Ambulatory Care - Regional</td>
<td>3,601</td>
<td>3,457</td>
<td>1,829</td>
</tr>
<tr>
<td>Regional Exports</td>
<td>87</td>
<td>84</td>
<td>44</td>
</tr>
<tr>
<td>Nursing Facilities</td>
<td>1,523</td>
<td>4,259</td>
<td>42</td>
</tr>
<tr>
<td>Regional Exports</td>
<td>21</td>
<td>52</td>
<td>1</td>
</tr>
<tr>
<td>Home Health</td>
<td>3,830</td>
<td>2,556</td>
<td>5</td>
</tr>
<tr>
<td>Community Health</td>
<td>816</td>
<td>194</td>
<td>14</td>
</tr>
<tr>
<td>Public Health</td>
<td>518</td>
<td>194</td>
<td>14</td>
</tr>
<tr>
<td>Nursing Education</td>
<td>1,436</td>
<td>-</td>
<td>79</td>
</tr>
<tr>
<td>Other</td>
<td>4,618</td>
<td>3,384</td>
<td>291</td>
</tr>
<tr>
<td>Statewide Demand</td>
<td>43,397</td>
<td>20,510</td>
<td>5,134</td>
</tr>
<tr>
<td>Total Exports</td>
<td>1,075</td>
<td>345</td>
<td>148</td>
</tr>
<tr>
<td><strong>Total Demand for Nurses (FTE)</strong></td>
<td><strong>44,472</strong></td>
<td><strong>20,855</strong></td>
<td><strong>5,282</strong></td>
</tr>
</tbody>
</table>

*All Figures in Full-Time Equivalents/FTEs*
• In 2012, there was a shortage in all three nurse types, state-wide. However, the shortage for RNs is expected to slow over the next 5 years with a slight surplus by 2018.
• The gap (demand – supply) for APRNs is expected to hold steady (at least 1,200 APRNs) through 2020.
• This assumes stable conditions for the next 7 years: same intensity factors (use of nurses per population size); same number of newly licensed nurses; same population migration and export of healthcare.
• However, shortages/surpluses differ by region. Shortage expected only in Baton Rouge, Lafayette, and New Orleans regions.
Why Are Some Regions Different?

- Regions with large urban populations have a different pattern of demand for healthcare... patients are less likely to have regular primary care with the same physicians and tend to go to urgent care or Emergency Rooms when they are sick.

- Regions with smaller rural populations tend to seek primary care with the same health care provider and when they do need serious treatment, however, they tend to go to a large urban medical center for care.
Simulations

Louisiana’s Multi-Regional Statewide Nursing Workforce Forecasting Model
What if the intensity factor for RNs increases by only 5% for inpatient hospital care in 2014?

Statewide, we would demand 1,700 RNs (FTEs) to meet the increase in demand created by a 5% increase in intensity factors only in hospitals in 2014. This modest increase in one year (2014) would eliminate the projected surplus (1,200 RNs) in 2020, and then some. That is, if there is an increase in hospital days of 5% in 2014, the supply of RNs in Louisiana would be outstripped by supply through 2020.
What is a Simulation Model?

Baseline Forecast based on current trends and demographics

What if a new specialized medical facility is built in one region to attract out of state patients?

How many new nurses would we need to avoid a shortage?

What if the role of some nurses change in various healthcare settings?
Next Steps

- Present the Forecasting Model to Stakeholders at regional, state, and national conferences and meetings
- Update the Forecasting Model each year using current registration data
- Seek funding to:
  - Develop comprehensive regional profiles of the current supply, demand, and education capacity for RNs, APRNs, and LPNs for the eight RLMAs
  - Validate and modify the assumptions in the Forecasting Model based on the most current data/information available
  - Use Geographic Information System Mapping to visually illustrate regional and statewide nursing workforce profiles
  - Develop regional and statewide recommendations for workforce development and strategic planning incorporating simulations based on proposed changes in the health care system and workforce.
We wish to recognize the following individuals for their contribution.

M. Lynn Ansardi, RN, Executive Director for the Louisiana State Board of Practical Nurse Examiners
Cynthia Bienemy, PhD, RN, Director for the Louisiana Center for Nursing
Jamey Boudreaux, Executive Director, Louisiana-Mississippi Hospice and Palliative Care Organization
Cecille Castello, RN, DHH Section Chief for Health Standards
Lisa Deaton, BSN, RN, Vice Chair of the Nursing Supply and Demand Council
Warren Hebert, RN, CAE, CEO, HomeCare Association of Louisiana
Cordt Kassner, PhD, Principal, Hospice Analytics
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