Nursing Workforce Models: What we can learn from state and national efforts (and the Kiwis)

Erin Fraher, PhD MPP
Director, Carolina Health Workforce Research Center
Assistant Professor, Departments of Family Medicine, UNC-CH

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The infamous disclaimer

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- The information, conclusions and opinions expressed in this presentation are mine and no endorsement by RWJ, NCHWA, HRSA, HHS, or The University of North Carolina is intended or should be inferred
This presentation in one slide

- Nursing workforce is critical to health system transformation
- Sometimes (often?) models don’t agree. Why?
- Why is modeling demand so difficult?
- What would the modeling field look like with fewer economists and more sociologists?
- Messaging your findings: is anyone listening?
- What have we learned from modeling physicians?
- What can we learn from abroad?
We spend a lot of time and money modeling physician supply but…

- There are 2.9 million nurses (4x as many as physicians!) in active practice
- Nursing care linked to quality and satisfaction measures that will increasingly be tied to value-based payments
- Nurses provide whole-person care across health and community based settings
- Nurses are the ultimate “flexible” workforce taking on new roles in transformed health system
And we spend a lot of time and money worrying about new care and payment delivery models—not enough focus on workforce

- Workforce is expensive:
  of $2.6 trillion spent on healthcare, 56% attributed to wages*

- Expensive and inefficient to lurch from oversupply to shortage

- New models of care dependent on having right skill mix

* Dunn L. Getting a Handle on Hospital Costs. *Hospitals and Health Networks.* 2015
Better workforce data and models can “smooth” the cycle

“Workforce planning needs to be a standing component of strategic planning for hospitals/health systems and not just a response to a crisis situation” - AHA, 2016

Great in theory but nursing models disagree: surplus or shortage?

- National nursing models mixed: some suggest overall supply will outpace demand, others find that demand will exceed supply
- Variation between (and within!) states
- Nursing enrollments are increasing rapidly
- But on the ground, we hear about shortages?

Could it be that our models are not accurate? (GASP)
Why don’t models agree (1)?
On the supply side alone, there are many reasons for differences...

<table>
<thead>
<tr>
<th>Model Attributes</th>
<th>Potential sources of differences</th>
</tr>
</thead>
<tbody>
<tr>
<td>How many nurses at baseline?</td>
<td>Which nurses? (LPNs, RNs, APRNs)</td>
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<tr>
<td></td>
<td>Headcount, licensed, active, FTE?</td>
</tr>
<tr>
<td>What is unit of geography?</td>
<td>National, state or sub-state?</td>
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<td></td>
<td>How to deal with nursing compact and tele-nursing?</td>
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<tr>
<td>When do nurses exit workforce?</td>
<td>Is probability of exiting workforce adjusted by age and cohort?</td>
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<td></td>
<td>Does model account for economic and other period effects?</td>
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<tr>
<td>How does model handle new entrants?</td>
<td>Does model allow for geographic migration of new graduates and actively practicing nurses?</td>
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</table>
Why don’t models agree (2)?
On the supply side alone, there are many reasons for differences...

<table>
<thead>
<tr>
<th>Model Attributes</th>
<th>Potential sources of differences</th>
</tr>
</thead>
<tbody>
<tr>
<td>How is FTE calculated?</td>
<td>Total hours worked? In patient care?</td>
</tr>
<tr>
<td></td>
<td>How is productivity measured?</td>
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<tr>
<td>How are specialties modeled?</td>
<td>Is S/D modeled by specialty?</td>
</tr>
<tr>
<td>How are employment settings modeled?</td>
<td>Does model distinguish between hospital inpatient, outpatient and ambulatory care?</td>
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<tr>
<td>How does the model handle uncertainty?</td>
<td>Does model have confidence intervals? “What if” scenarios?</td>
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<tr>
<td>Data sources</td>
<td>National or state level data?</td>
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<tr>
<td></td>
<td>Survey or licensure data?</td>
</tr>
<tr>
<td>Modeling approach</td>
<td>Per population trend, stock and flow, microsimulation, system dynamics</td>
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</table>
A Case Study: Analysis of CPS data shows hospital employment on the rise

Full-Time Equivalent (FTE) RNs by Hospital and Non-hospital Settings
Auerbach, D., Buerhaus, P., Skinner, L., & Staiger, D.

Hospital employment “edged up by about 26,000 FTE RNs during the 1st quarter of 2017”

Yet CES data show fastest job growth is in ambulatory care and home health care.

South Carolina’s state-level licensure data show steady hospital employment.

Percent of Registered Nurse Workforce Employed in Hospitals, South Carolina, 2004-2014

Source: SC Office for Healthcare Workforce, RNs active in the South Carolina workforce based on self-reported employment information provided during the biennial license renewal period, years 2004 – 2014.
But percent working inpatient decreased, while “hospital-wide” roles increased.

Source: SC Office for Healthcare Workforce, RNs active in the South Carolina workforce based on self-reported employment information provided during the biennial license renewal period, years 2004 – 2014.
Meanwhile in NC (where the bbq is better), looks like nurses are exiting hospital employment.

Note: Data include active, instate RNs licensed in North Carolina as of October 31 of the respective year. Source: NC Health Professions Data System, with data derived from the NC Board of Nursing, 1999-2015. Produced by: Program on Health Workforce Research and Policy, Cecil G. Sheps Center for Health Services Research, University of North Carolina at Chapel Hill.
But that’s because the NC Board of Nursing changed data collection methods to match the NCSBN’s Nursys Minimum Data Set

### Employment Settings, North Carolina

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<tbody>
<tr>
<td>1. Hospital in-patient</td>
<td>1. Hospital</td>
</tr>
<tr>
<td>2. Hospital out-patient</td>
<td>2. Ambulatory care</td>
</tr>
<tr>
<td>5. HMO/insurance</td>
<td>5. Insurance</td>
</tr>
<tr>
<td>8. <strong>Mental health facility</strong></td>
<td>8. Academia</td>
</tr>
<tr>
<td>10. Industry/manufacturing</td>
<td>10. School health</td>
</tr>
<tr>
<td>11. Private duty</td>
<td>11. Other</td>
</tr>
<tr>
<td>12. School of nursing/medicine</td>
<td>12. Community Health</td>
</tr>
<tr>
<td>13. Other</td>
<td>13. Policy/Regulatory Licensing</td>
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</table>
Change highlights confusion about how nurses working in hospital outpatient settings report setting

Employment setting in 2013

Employment setting in 2015

Hospital outpatient (n=9,063)

Active in 2015 (n=7,863) 87%

Inactive/Missing Setting in 2015 (n=1,200) 13%

Hospital (n=3,820) 49%

Ambulatory Care (n=3,060) 39%

Other Setting (n=983) 13%

81% (2,483) worked in ambulatory settings that were owned or affiliated with a hospital

Note: Data include active, instate RNs licensed in North Carolina as of October 31, 2013 and 2015.
Source: NC Health Professions Data System, with data derived from the NC Board of Nursing, 2013 and 2015.
Produced by: Program on Health Workforce Research and Policy, Cecil G. Sheps Center for Health Services Research, University of North Carolina at Chapel Hill.
But why do we care about collecting data on setting? What are we trying to understand?

- **Employment setting**—so we can forecast demand in different settings?
- **Patient population**—so we can understand specialties needed to deliver services?
- **Content of care**—so we can quantify how nursing roles are changing?
- **Employer**—so we can understand how practice ownership might affect nurse deployment?

But where is the patient in all this? 
*(hold that thought... we’re going to get there)*
And if you thought that was confusing, what about modeling demand?

- Patient Expectations
- Payment
- Models of care
- Insurance and income
- Epidemiology
- Demography
- Socio-economic and risk factors
- Disease Prevalence

Demand
Need
We model utilization based on historical patterns, need better “real time” data

To help us understand changes in:

• **Demand in different settings** — is demand in ambulatory settings increasing?

• **Demand in different specialties** — is demand greater in some practice areas (ICU, ER, L&D and OR)?

• **Demand in different geographies** — is demand higher in certain geographic areas?

• **Roles for nurses** — how are roles changing?
Better engagement with employers is needed to inform our modeling efforts

To help us understand changes in:

• **Retention in workforce** — attrition of new nurses seems to be on the rise

• **Hours worked** — do millennials have different labor force participation rates?

• **Substitution** — how is deployment of MAs, LPNs, RNs, APRNs, physicians, social workers changing?

• **Effect of payment policy** — how are nurses employed under different payment models?
Maybe we need more sociologists engaged in workforce modeling?

“THE only function of economic forecasting is to make astrology look respectable.”
—John Kenneth Galbraith

Perhaps the modeling field needs more sociologists to infuse new conceptual models and analytic approaches?

For Example:
The life course model emphasizes that individuals, institutions and social structures change over time and that human lives are embedded in specific historical times and places that shape their content, pattern and direction.

Glen H. Elder Jr, “The Life Course and Human Development: Contributions, Challenges, and New Directions”, April 7, 2006
Life Course Theory: A lens for examining nursing careers

Life course methodologies could be used to capture dynamic forces shaping nursing careers:

1. **Longitudinal** analyses that characterize how individual nurses’ careers unfold over time

2. A better understanding of how nurses’ career decisions are “a joint function of the characteristics of the person and the environment”¹

3. More **temporally sensitive analyses** that investigate the interaction of period, age, gender and cohort effects on career decisions.
Conceptual Model: Factors influencing nurses’ career decisions

- Cohort Effects (birth cohorts)
- Gender Effects
- Age Effects
- Period Effects (recessions, changes in wages, health system reform)

Nurse’s Career Decisions at time $t, t+1...t+n$
Nurses in different cohorts and career stages affected differentially by period effects

- Health care system and social structures have undergone dramatic change
- Economic “shocks” have large impact on nursing workforce
- Need to identify relationship between nurses’ career decisions and the changing context of health care, social structures and care delivery/payment models
- Will uncover “a path whose twists and turns are a result of the complex interactions between a ‘minded self’ and the environment.”

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Methodological approaches

• Requires longitudinal, panel data

• Create nurse-specific career histories to illuminate the dynamic nature of transitions into and out of various states
  – Activity status, hours worked, position type, changes in employment setting, specialty, educational progression, geographic migration, etc.

• Work by Kovner & Brewer and Auerbach, Buerhaus & Staiger has begun to do this but more work needed
If you build it (a model), will they come?

I’ve learned the hard way: the answer is NO!
We built a Mazzerati that no one knew how to drive

- In July 2014, launched interactive, web-based physician model
- Allows users to customize national, state and substate views of supply, utilization and shortage
- Lots of hits (by consultants and health systems) but didn’t reach policy audience
- Now releasing series of policy briefs

Field is moving toward greater use of data visualization tools

https://webnursingmodel.hrsa.gov/

nchealthworkforce.sirs.unc.edu
But even sexy visualizations require messaging

Messaging findings requires courage and savvy because models sometimes:

• reveal “uncomfortable truths”
• highlight inequities
• highlight uncertainty about future
• run counter to advocacy agendas

At their best, models challenge status quo, create new knowledge, spur policy action and disrupt the prevailing narrative
Here’s one of my favorites, challenging the “jaws of death”
Modelers need to engage clinicians to help with interpretation and messaging

Clinicians are critical to:

- Identify when data don’t smell right
- Give input on analysis plan
- Develop “what if” scenarios that reflect best guesses about future models of care
- Help interpret model findings in “real world” context

*Actually use model findings to implement change*
Example: Our model projected that pediatric surgical FTEs would double between 2011 and 2013.

Source: FutureDocs Forecasting Tool, Program on Health Workforce Research and Policy, Sheps Center for Health Services Research, UNC-CH. [https://www2.shepscenter.unc.edu/workforce/]
Worked with American Pediatric Surgical Association to interpret meaning of findings

- Likely oversupply of pediatric surgeons means there would not be volume of cases needed to train new residents and maintain skills of existing surgeons
- Recommended decreasing number of ped surgery fellowships
- And shift in focus to geographic imbalances

Other things I’ve learned from modeling physicians

• We tried to ask a different question: what services will patients need versus how many doctors will we need?
  ➤ *People still asked us “how many doctors will we need?”*

• We sought to develop a tool, not an answer
  ➤ *People wanted an answer*

• Developed plasticity matrix to map services provided by physicians, NPs and PAs to patients’ visits
  ➤ *(Some) people have allergic reactions to talk of substitution*

• Our model found overall supply sufficient, major issues of distribution by specialty and geography
  ➤ *People, especially the press, like shortage headlines*
So I asked myself, “What Would the Kiwis Do?”
New Zealand Stats:
4.6 million people
- 71% European
- 15% Maori
- 12% Pacific peoples

Life expectancy
- 81.6 years (US 78.8)

Health costs:
- 9.4% of GDP (US 17%)

Nurses per 10K pop
- 108 (US 86)

Public funds as % of total health expenditures:
- 80% (US 49%)

Annual physician visits per pop
- 3.7 (US 4.0)

http://inspiredbyaustralasia.co.uk/maps.htm
Health workforce challenges in New Zealand (sound familiar?)

• Current health workforce:
  – not sustainable
  – less productive than in past
  – too many workers not practicing anywhere near top of scope of practice
  – not meeting quality outcomes
  – poorly distributed against need
  – large proportion of workforce nearing retirement

• Primary care, mental health, oral health, and rehabilitation systems “not up to scratch”
New Zealand’s Approach: The Workforce Service Forecast (WSF)

• NZ asks “What are patient’s needs for care and how might health professional roles, regulation, education and practice be redesigned to meet those needs?”

• Goal of WSFs: envision workforce needed to meet doubling of demand, with 15% increase in funding, maintaining (or improving) patient satisfaction

• Approach encourages outside-the-box thinking about what care pathways and workforce should be

• Instead of retrofitting care delivery models to meet the competencies and roles of the existing workforce
Health Workforce New Zealand’s Workforce Service Forecasts

**Health service areas**

- Aged Care
- Anesthesia workforce
- Dermatology
- Diabetes
- Eye health
- Gastroenterology
- Mental health
- Musculoskeletal
- Palliative care
- Plastic surgery
- Rehabilitation

**Populations**

- Youth health
- Maori health
- Pacific health
- Mothers, fathers and babies
How NZ is Addressing Workforce Challenges: **Clinician-Led Change**

- Transforms from ground up, rather than top down
- Asks clinicians to design ideal patient pathways by disease area and identify changes that enable new models of care
- Making it personal: “How should we care for Aunt Susie with dementia?”
- Engaging “coalitions of the willing” to overcome professional resistance and “tribalism”
How NZ is Addressing Workforce Challenges:

Engaging Employers

- Are new grads ready for practice?
- Where are biggest skill gaps and in which professions?
- What curriculum changes are needed for future?
- What new or retooled workforce is needed to avoid readmissions and integrate health and social care?
- In what professions, and for which areas of patient care, is the workforce over- and under-skilled?
How a focus on patients’ needs has enabled NZ to redesign nursing roles

NZ has enhanced role for RNs (not just APRNs)

• Visited practice with 17,000 patients, 10 RNs, 10 GP FTEs, and 1 Health Care Assistant (think MA)

• RNs run clinics—wound care, cervical screening, immunizations, removal of lesions, etc. “Duty nurse” handles acute cases and sees patients with chest pains, asthma and broken limbs. RNs refer and collaborate, as needed, with GP.

• Since 2011, diabetes nurse prescribers have been in practice. Evaluations show good outcomes.

• As of 20 September 2016, prescribing authority extends beyond diabetes nurses to RNs working in primary health and specialty teams (already in place in the UK and Ireland)
Taking a more pragmatic, and less academic, approach to modeling

- Patient-centered, not profession-centered
- Workforce planning within defined budget
- Planning for a workforce for health, not a health workforce
- Modeling findings need to be directly connected to employers, educators, regulators, payers and clinicians
Contact info

Erin Fraher
erin_fraher@unc.edu
(919) 966-5012

Program on Health Workforce Research and Policy
http://www.healthworkforce.unc.edu