MANDATED NURSE-TO-PATIENT STAFFING RATIOS IN MASSACHUSETTS

RESEARCH PRESENTATION: ANALYSIS OF POTENTIAL COST IMPACT
HPC oversight authority and role in analyzing mandated nurse staffing ratios

- The HPC was established to oversee the Commonwealth’s health care delivery and payment system and monitor growth in health care spending against the cost growth benchmark; it has a **specific statutory responsibility to examine factors that contribute to cost growth** within the Commonwealth’s health care system as part of the Annual Cost Trends Hearing.

- In 2018 Pre-filed Cost Trends Hearing testimony, a **majority of stakeholders identified proposed mandatory nurse staffing ratios as a top area of concern** regarding the Commonwealth’s ability to meet the health care cost growth benchmark.

- As an independent agency principally focused on containing health care costs, the **HPC has conducted an objective, data-driven cost impact analysis** of mandated nurse staffing ratios to further inform continuing policy discussions on the matter.

- In addition to today’s presentation of its cost impact analysis, the HPC will examine the topic of mandated nurse staffing ratios at this year’s **Annual Cost Trends Hearing** (October 16-17), including a **panel discussion** on the impact of nurse staffing ratios on cost, quality, and access.

- As additional background, the HPC had a central role in implementing the 2014 law mandating nurse staffing **ratios of 1:1 or 1:2 in intensive care units** (ICUs) in acute care hospitals, depending on the stability of the patient as assessed by an acuity tool and staff nurses; the HPC engaged in an extensive **regulatory development process** to implement the law\(^1\).
Overview of HPC research and cost impact analysis

HPC’s research and analysis includes:

- Summary of the proposed initiative petition and comparison to the California law and regulation
- Summary of California’s experience with mandated staffing ratios
- Comparison of CA and MA hospitals on quality measure performance
- Background on the RN workforce in MA
- Methodology and analysis of cost impact, including the breakdown of additional RNs required and the cost impact for hospitals, freestanding psychiatric/SUD hospitals, other providers, and the Commonwealth
- Additional costs not included in the cost impact analysis, including potential impact on emergency departments
- Potential cost savings
- Potential sources for additional RNs required and discussion of MA labor market
- Implications for statewide health care spending

The description of the proposed initiative and assumptions made in developing the cost estimate are for research purposes only. Nothing in this research presentation should be construed to be an interpretation by the Health Policy Commission of the proposed initiative which, should it become law, requires development of regulation pursuant to M.G.L. c. 30A.
HPC’s work was led by nationally-recognized nurse workforce experts

David Auerbach, Ph.D. and Joanne Spetz, Ph.D., led the HPC’s research and analysis.

**Dr. David Auerbach**, Director for Research and Cost Trends at the Health Policy Commission, is a health economist whose work has spanned a number of focus areas, including the health care workforce. Dr. Auerbach has specialized in, and is a nationally-recognized expert on the Registered Nurse workforce including advanced practice nurses.

**Dr. Joanne Spetz** is a Professor at the Institute for Health Policy Studies at the University of California, San Francisco. Her fields of specialty include economics of the health care workforce, shortages and supply of registered nurses, and organization and quality of the hospital industry. Dr. Spetz is an Honorary Fellow of the American Academy of Nursing. The HPC engaged the University of California, San Francisco in mid-August 2018 in furtherance of its research agenda with respect to health care workforce issues.
Current regulatory requirements and other considerations for nurse staffing in Massachusetts

Regulatory Requirements for Staffing

- State and federal regulations require Massachusetts hospitals to staff nurses at levels appropriate for patient care in all care areas, including non-ICU units.
- Specifically, state regulations require Massachusetts hospitals to staff at sufficient levels needed to provide nursing care that requires the judgment and specialized skills of a registered nurse to all patients as needed\(^1\).
- State regulations also require nursing staff, including staff nurses, to demonstrate competency in skills specific to their care area on a routine basis.
- In addition, hospitals may be required by regulation, or may elect, to follow professional guidelines for staffing, such as the Association of Women’s Health, Obstetric and Neonatal Nurses (AWHONN) Guidelines for Professional Registered Nurse Staffing for Perinatal Units.

Other Considerations for Staffing

- Collective bargaining agreements may provide specific staffing requirements.
- In general, hospitals create staffing plans to address anticipated need, based on historical patient and staff censuses and other hospital-specific factors in each type of unit, and the staffing may be adjusted as needed.

\(^1\)See 105 CMR 130.311, 105 CMR 130.312, 42 CFR 482.23(b), and 104 CMR 27.03(9)(b)(4)
Summary of the proposed initiative petition

- On November 6, 2018, Massachusetts voters will vote on **Question 1**, the proposed **Initiative Petition For a Law Relative to Patient Safety and Hospital Transparency**

- If enacted into law, the proposed initiative (effective date January 1, 2019) would **mandate specific registered nurse-to-patient staffing ratios** (i.e., maximum patient assignment limits) in Massachusetts hospitals, based on unit type, including:
  - In all units with step-down/intermediate care patients, 1 nurse to 3 patients (1:3)
  - In all units with maternal child care patients, there are different patient assignment limits, including:
    - 1:1 for active labor patients, patients with intermittent auscultation for fetal assessment, and patients with medical or obstetrical complications
    - 1:1 for the mother and 1:1 for the baby during birth and for up to 2 hours postpartum (until both are stable and critical elements are met)
    - 1:6 postpartum for uncomplicated mothers or babies, comprised of either six mothers or babies, three couplets (1 mother and 1 baby), or in the case of multiple babies, not more than a total of six patients
  - In all units with medical/surgical patients, 1:4
  - In all units with psychiatric patients, 1:5
Summary of the proposed initiative petition, continued

- The mandated nurse staffing ratios would be in effect **at all times**
- The proposed initiative would **prohibit hospitals from reducing the staffing level of the health care workforce** as a result of implementing the assignment limits
  - Hospitals would be required to submit a [written implementation plan](#) to the HPC certifying that it will implement the patient assignment limits without diminishing the staffing levels of its health care workforce
- Hospitals would be required to [develop a patient acuity tool](#) for each unit to be used to determine whether the maximum number of patients that may be assigned should be lower than the assignment limits
- Hospitals would be required to [post a notice](#) regarding the patient assignment limits in a conspicuous place(s) on the premises, including within each unit, patient room, and waiting area
- The proposed initiative would give the HPC and the Attorney General’s Office responsibilities regarding [enforcement](#), including written compliance plans and penalties of up to $25,000 per violation
Comparison of CA law and MA proposed initiative

California is the only state with mandated nurse staffing ratios in all hospital units. The CA legislature passed a law in 1999 that was implemented beginning in 2004. The next two slides summarize key differences between California’s law and the proposed initiative in Massachusetts.

<table>
<thead>
<tr>
<th></th>
<th>California law &amp; regulation</th>
<th>MA proposed initiative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Determination of ratios</td>
<td>Law mandated CA State Department of Health Services to establish unit-specific minimum staffing levels by regulation.</td>
<td>Specific, numeric ratios are written into the proposed initiative.</td>
</tr>
<tr>
<td>Implementation timeline</td>
<td>Implementation in CA took place over several years and in a staggered fashion.</td>
<td>If enacted into law, the act would have an effective date of January 1, 2019.</td>
</tr>
<tr>
<td>Scope and level of ratios</td>
<td>Overall, less strict than the proposed initiative in MA (e.g., 1:5 in med/surg; 1:6 in psych units).</td>
<td>Overall, more strict than CA’s law (e.g., 1:4 in med/surg; 1:5 in psych units).</td>
</tr>
<tr>
<td>Licensed nursing personnel subject to the ratios</td>
<td>Licensed vocational nurses (and in psychiatric units only, psychiatric technicians) may constitute up to 50% of the licenses nurses assigned to patient care on any unit (except where RNs are required).</td>
<td>Patient assignment limits apply to registered nurses only.</td>
</tr>
<tr>
<td>Health care workforce staffing</td>
<td>No prohibition on reduction of health care workforce staffing levels as a result of implementation of the minimum staffing ratios.</td>
<td>Prohibition on any reduction in health care workforce staffing levels (including staffing of non-licensed nurses) as a result of implementation of the patient assignment limits.</td>
</tr>
</tbody>
</table>
## Comparison of CA law and MA proposed initiative, continued

<table>
<thead>
<tr>
<th></th>
<th>California law &amp; regulation</th>
<th>MA proposed initiative</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Patient Classification System/Acuity Tool</strong></td>
<td>Patient classification system requirement in place before the law, but the requirements are not prescriptive/specific and certification is not required.</td>
<td>Acuity tool must be developed and certified by the HPC prior to implementation as meeting certain criteria.</td>
</tr>
<tr>
<td><strong>Waivers</strong></td>
<td>Department of Health Services is authorized to issue waivers for rural hospitals in response to their special needs.</td>
<td>As written, the proposed initiative prohibits the HPC from considering waivers in its regulatory development process.</td>
</tr>
<tr>
<td><strong>Emergencies</strong></td>
<td>If a healthcare emergency (as defined in regulation) causes a change in the number of patients in a unit, hospitals must demonstrate that prompt efforts were made to maintain required staffing levels.</td>
<td>Requirements (and enforcement thereof) shall be suspended during a state or nationally declared public health emergency.</td>
</tr>
<tr>
<td><strong>Enforcement</strong></td>
<td>Enforcement relies primarily on reporting of noncompliance.</td>
<td>The proposed initiative explicitly addresses enforcement, including monetary penalties.</td>
</tr>
</tbody>
</table>
Summary of California’s experience with mandated staffing ratios

- In the 14 years since mandated nurse staffing ratios in California were implemented, many studies have been published on the impact of the law and subsequent regulation.

- The following slides summarize four key takeaways from California’s experience and the resulting literature following implementation of the mandated staffing ratios:

1. There was a significant increase in nurse staffing in California hospitals post-implementation of ratios.

2. There was a moderate effect on RN wages post-implementation of ratios.

3. There was no systematic improvement in patient outcomes post-implementation of ratios.

4. There has been no comprehensive, retrospective analysis of implementation costs.
Summary of California’s experience with mandated staffing ratios

1. There was a significant increase in nurse staffing in CA hospitals post-implementation of ratios
   - Multiple studies of CA hospitals found annual average numbers of RN productive hours and nurse staffing ratios in medical/surgical units increased markedly after implementation of the regulations
   - One study found that statewide average RN hours per patient day increased 16.2% from 1999 through 2006, to an average of 6.9 hours per patient day
   - A review of all studies conducted through 2012 reported that the average minimum reported growth in hours per patient day was 30 minutes and some studies reported an average increase of up to one hour
   - The growth in licensed nurse staffing was primarily the result of increases in RN staffing; no study reported an increase in LVN staffing
   - One study suggested that the substitution of licensed nurses for unlicensed staff may have occurred; the increase in RN staffing was larger than the overall staffing increase

2. There was a moderate effect on RN wages post-implementation of ratios
   - In theory, when the demand for workers rises more rapidly than the supply, an increase in wages is anticipated
   - Researchers of the impacts of implementation of mandated nurse staffing ratios in California found wage increases across all RNs that ranged from 0% to 8%

See Appendix for full citations.
There was no systematic improvement in patient outcomes post-implementation of ratios

- In general, higher levels of nurse staffing have been associated with improvements in certain patient outcomes – for example, shorter hospital stays\(^1\); lower rates of “failure to rescue”\(^2\); and fewer pressure ulcers and hospital-acquired infections\(^3\).
- There have been a number of studies done on the impact of CA’s staffing ratios on patient outcomes, with mixed results.
- The most comprehensive analysis found, in part, that “failure to rescue” following a complication decreased significantly more in some CA hospitals than hospitals in comparison states\(^4\); for other outcomes, the results were mixed – some worsened, some improved, and some did not change\(^5\).
- Taken together, the literature indicates that CA’s regulations did not systematically improve the quality of patient care.

There has been no comprehensive, retrospective analysis of implementation costs

- Following passage of the law but prior to implementation of the ratios (pursuant to Department of Health Services regulations), researchers estimated potential cost impact based on varying ratio proposals (i.e., the California Nurses Association, SEIU, and California Hospital Association proposals)\(^6\).
- A later (2012) study concluded that implementation of mandated staffing ratios in CA put substantial financial pressures on many hospitals, concentrated among hospitals in the middle two quartiles of pre-regulation staffing levels\(^7\).
- There has been no comprehensive, retrospective analysis of implementation costs of mandated staffing ratios in California.

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3 There was no systematic improvement in patient outcomes post-implementation of ratios

4 There has been no comprehensive, retrospective analysis of implementation costs

As of 2016, Massachusetts had higher hospital RN staffing levels (FTEs per 1,000 inpatient days) than California and the U.S.
Massachusetts hospitals performed better than California hospitals on 5 of 6 nursing-sensitive quality measures reviewed.

<table>
<thead>
<tr>
<th>Measure</th>
<th>Standardized Infection Ratio</th>
<th>MA</th>
<th>CA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Catheter-associated urinary tract infection (CAUTI)</td>
<td>1.08</td>
<td>1.12</td>
<td></td>
</tr>
<tr>
<td>Central venous catheter-related bloodstream infections (CLABSI)</td>
<td>0.75</td>
<td>0.97</td>
<td></td>
</tr>
<tr>
<td>Hospital-onset CD infection</td>
<td>0.96</td>
<td>1.09</td>
<td></td>
</tr>
<tr>
<td>Hospital-onset methicillin-resistant MRSA bacteremia</td>
<td>0.81</td>
<td>0.98</td>
<td></td>
</tr>
<tr>
<td>Surgical site infections following colon surgery</td>
<td>0.93</td>
<td>1.07</td>
<td></td>
</tr>
<tr>
<td>Ventilator-associated events (VAE)</td>
<td>1.45</td>
<td></td>
<td>0.77</td>
</tr>
</tbody>
</table>

Note: A lower value indicates better performance on these measures, and a value less than 1.0 indicates that there were fewer events than expected.

Centers for Disease Control and Prevention/Agency for Healthcare Research and Quality/National Healthcare Safety Network (2015). The “Standardized Infection Ratio” is a measure of observed over expected hospital-acquired infections and adjusts for patient-level factors that contribute to hospital-acquired infection risk. A ratio of less than 1.0 indicates that there were fewer events than expected.
Massachusetts and California perform similarly on 3 additional nursing-sensitive quality measures covering states’ Medicare populations.

**Events per 1,000**

<table>
<thead>
<tr>
<th>Event</th>
<th>MA</th>
<th>CA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pressure Ulcer Rate (PSI-3)</td>
<td>0.28</td>
<td>0.26</td>
</tr>
<tr>
<td>In-hospital Fall with Hip Fracture Rate (PSI-8)</td>
<td>0.11</td>
<td>0.11</td>
</tr>
</tbody>
</table>

**Composite index performance**

<table>
<thead>
<tr>
<th>Composite Indicator</th>
<th>MA</th>
<th>CA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient Safety and Adverse Events Composite (PSI-90)</td>
<td>0.95</td>
<td>0.96</td>
</tr>
</tbody>
</table>

*Note: A lower value indicates better performance on this index.*

Centers for Medicare & Medicaid Services, Hospital Compare, 2017. PSI-3 and PSI-8 are expressed as events are per 1,000 patients and are computed as the median value among each state's hospitals. Composite indicator “PSI-90” includes PSI 3, 6, 8-15 and is an index such that values below 1.0 indicate better performance than expected given a hospital's patient mix.
Massachusetts has more, and higher-earning, RNs than most states

83,543
Massachusetts FTE RNs

2,898,834
Rest of U.S. FTE RNs

~20%
RN compensation as a percentage of hospital expenses

122.4
MA
122.4
89.6
Rest of U.S.
FTE RNs PER 10,000 POPULATION

$84K
MA
$68K
Rest of U.S.
AVG ANNUAL EARNINGS: ALL RNs

$90K
MA
$72K
Rest of U.S.
AVG ANNUAL EARNINGS: HOSPITAL RNs

44%
35%
MA
Rest of U.S.
AGE 50+

68%
RNs in MA with Bachelor’s degree or higher

63%
RNs in the rest of the U.S. with Bachelor’s degree or higher

RNs in Massachusetts work in a variety of settings

- Inpatient staff most directly affected by mandate: 15,000
- Other inpatient staff (e.g., managers, ICU): 16,800
- Ambulatory/outpatient and physicians’ offices: 15,600
- Home Health/SNF/Extended care/Rehab: 13,000
- Schools and Community Health Centers: 17,700
- Other (including non-nursing roles): 5,400

83,500 RNs in Massachusetts

Figures are rounded to the nearest hundred. Inpatient staff most directly affected by mandate represent the RNs identified in PatientCareLink and other supplemental nurse staffing data obtained by the HPC. RNs in the other settings are derived from a combination of data from the Massachusetts Department of Public Health (https://www.mass.gov/files/documents/2018/07/06/health-professions-data-series-registered-nurses-2014.pdf) and the American Community Survey.
Summary of HPC cost impact analysis methodology

The HPC developed the following methodology for the analysis:

- **Examined FY2017 staffing levels** in MA hospitals, using publicly available PatientCareLink data:
  - Units included in HPC analysis: medical, surgical, psychiatric/behavioral health, pediatrics, step-down, rehabilitation, neonate intermediate care, labor/delivery, maternal child care, post-anesthesia care, operating room
  - For additional information about units not included, see slide 27

- **Calculated expected number of additional RNs required** to meet the mandated ratios in all units according to the proposed initiative, as follows:
  - Analyzed FY2017 staffing reports by hospital unit, by shift and compared average RN staffing to the ratios in the proposed initiative; and
  - Adjusted estimated number of additional RNs needed to comply with the “at all times” mandate, as described in the following slides

- **Calculated potential impact on psychiatric/SUD hospitals**

- **Estimated impact on RN wages**

- **Considered additional costs** associated with the proposed initiative (e.g., acuity tool costs), as well as opportunities for cost savings

As detailed in the following slides, the HPC presents the results of its cost impact analysis as **Analysis A** and **Analysis B**.

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1PatientCareLink.org is a joint venture of the Massachusetts Health & Hospital Association (MHA), Organization of Nurse Leaders of MA, RI, NH, CT, VT (ONL), Home Care Alliance of Massachusetts (HCA) and Hospital Association of Rhode Island (HARI). See [www.patientcarelink.org](http://www.patientcarelink.org). Staffing data for certain units not included in PatientCareLink were made available to the HPC by the Massachusetts Health & Hospital Association.
Illustration of the analytic approach to quantify additional RNs required to comply with “at all times” requirement

For this illustration, each vertical bar represents a hypothetical medical-surgical unit of an acute care hospital with an average daily census of 40 patients. Current RN staffing per unit, as shown by **solid blue bars**, varies by hospital. To comply with a 1:4 nurse-to-patient ratio with an average daily census of 40 patients, a unit must have (at minimum) 10 RNs (indicated by the **solid orange horizontal line** across all columns). The **stacked solid orange bar** indicates the additional staffing needed to reach the mandated 1:4 ratio. The **dashed orange horizontal line** indicates the staffing level required to meet the “at all times” requirement (shown as the 10% assumption employed in Analysis A). The stacked **partially shaded solid orange bar** indicates the additional staffing needed to reach the “at all times” level. No additional nurses are added where the hospital unit staffing exceeds the “at all times” level (see unit 10).

Data in this illustration do not represent staffing levels at any particular hospital.
## Estimated additional RNs required for compliance in hospital units examined by the HPC

<table>
<thead>
<tr>
<th>Key Parameters</th>
<th>Difference Between Average Staffing and Proposed Ratios</th>
<th>Analysis A</th>
<th>Analysis B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Additional RNs required for compliance with “at all times” requirement in proposed initiative¹</td>
<td>n/a</td>
<td>10%</td>
<td>20%</td>
</tr>
<tr>
<td>Key Results</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Percentage of all shifts that would be required to increase RN staffing to meet mandate</td>
<td>34% (726 of 2,143 shifts)</td>
<td>46% (980 of 2,143 shifts)</td>
<td>54% (1,156 of 2,143 shifts)</td>
</tr>
<tr>
<td>Additional full-time equivalent RN staff required to meet mandate (% RN workforce increase)</td>
<td>1,144 (8% more RNs)</td>
<td>1,809 (12% more RNs)</td>
<td>2,624 (17% more RNs)</td>
</tr>
</tbody>
</table>

¹Accounts for RN coverage required in a variety of circumstances, such as federally mandated meal breaks, patient census variability (i.e., surges in patient flow), RN time off the unit, and other instances where coverage is needed to comply with the “at all times” mandate in the proposed initiative.
Increase in RNs required to meet the mandate would be greatest in community hospitals and night shifts

**Percentage increase in staffing required, by hospital type**

<table>
<thead>
<tr>
<th>Hospital Type</th>
<th>Analysis A (Increase in RNs)</th>
<th>Analysis B (Increase in RNs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Community-HPP</td>
<td>21%</td>
<td>30%</td>
</tr>
<tr>
<td>Community</td>
<td>14%</td>
<td>20%</td>
</tr>
<tr>
<td>Teaching</td>
<td>12%</td>
<td>18%</td>
</tr>
<tr>
<td>AMC</td>
<td>5%</td>
<td>7%</td>
</tr>
<tr>
<td>Specialty</td>
<td>4%</td>
<td>7%</td>
</tr>
</tbody>
</table>

**Community – High Public Payer hospitals would be most affected**

**Percentage increase in staffing required, by shift**

<table>
<thead>
<tr>
<th>Shift</th>
<th>Analysis A (Increase in RNs)</th>
<th>Analysis B (Increase in RNs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Night</td>
<td>23%</td>
<td>31%</td>
</tr>
<tr>
<td>Evening</td>
<td>10%</td>
<td>15%</td>
</tr>
<tr>
<td>Day</td>
<td>7%</td>
<td>11%</td>
</tr>
</tbody>
</table>

**Night shifts would be most affected**
Increase in RNs required to meet the mandate would also vary by hospital service

"n = #" beneath each hospital service type indicates the number of RNs included in the analytic sample. For example, there are 286 RNs included in the analytic sample that are categorized as caring for patients in a neonate intermediate care unit (additional note: levels of care for neonates are determined by the American Academy of Pediatrics). See more information here: http://pediatrics.aappublications.org/content/114/5/1341.
Number of RNs required to meet the mandate would be greatest in Medical/Surgical units

Medical/surgical units account for the largest additional workforce (an additional 837 FTE RNs) needed for mandate compliance, followed by psychiatric units in acute care hospitals (an additional 327 FTE RNs)

Supporting figures are from Analysis A; n=1,809 additional RNs needed across all service types. 837 FTE RNs are exactly 46.3% of the workforce deficit overall. See appendix slide 36 for more detail by service type.
Approach for estimating additional RNs required in psychiatric/SUD hospitals; and overall additional RN workforce estimates

- For psychiatric/SUD hospitals, HPC used an aggregate estimate of RNs needed to meet the 1:5 mandated ratio (n=477)\(^1\)
- The HPC was unable to make any adjustments for “at all times” given the lack of unit and shift-level data for these hospitals

Overall additional RN workforce estimates

Analysis A (1,809) + Psychiatric/SUD Hospitals (477) = 2,286
Analysis B (2,624) + Psychiatric/SUD Hospitals (477) = 3,101

2,286 – 3,101 additional FTE RNs required

\(^1\text{Data source and methodology described in slide 36.}\)
Estimated impact on RN wages

- The required increase in RNs hospital staff would likely increase the demand for RNs in Massachusetts, leading to an increase in RN earnings over time.

- Researchers of the impacts of mandated nurse staffing ratios in California found that statewide RN wages rose faster during the period of implementation than they did in other states at the same time using 5 separate datasets. The difference ranged from 0 to 8% and averaged approximately 4%\(^1\).

- The impacts could be larger in Massachusetts due to, for example: stricter ratios, monetary penalties, and the prohibition on using other licensed nursing staff to meet the ratios.

- Based on California literature, HPC estimated RN workforce wage increases:
  - 4% in Analysis A
  - 6% in Analysis B

- RN wage increases for existing RNs resulting from mandated nurse staffing ratios would likely not occur immediately (e.g., due to pre-existing labor contracts).

\(^1\)Mark et al (2009); Munnich (2014). See Appendix for full citations.
The HPC’s analysis of mandated nurse staffing ratios estimates $676 to $949 million in annual increased costs once fully implemented.

<table>
<thead>
<tr>
<th>Category</th>
<th>Analysis A</th>
<th>Analysis B</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Costs to Hospitals</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Acute Care Hospitals</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Additional RNs required</td>
<td>$256 million</td>
<td>$379 million</td>
</tr>
<tr>
<td>Wage increase for existing RNs</td>
<td>$184 million</td>
<td>$276 million</td>
</tr>
<tr>
<td>Acuity tools (ongoing costs)¹</td>
<td>$26 million</td>
<td>$26 million</td>
</tr>
<tr>
<td><em>Psychiatric/Substance Use Disorder Hospitals</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Additional RNs required</td>
<td>$48 million</td>
<td>$51 million</td>
</tr>
<tr>
<td>Wage increase for existing RNs</td>
<td>$1 million</td>
<td>$2 million</td>
</tr>
<tr>
<td><strong>Costs to Other (Non-Hospital) Providers</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wage increase for existing RNs</td>
<td>$93 million</td>
<td>$140 million</td>
</tr>
<tr>
<td><strong>Costs to the Commonwealth</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Implementation at state-operated hospitals²</td>
<td>$67.8 million</td>
<td>$74.8 million</td>
</tr>
<tr>
<td><strong>TOTAL ESTIMATED ANNUAL COSTS</strong></td>
<td>$676 million</td>
<td>$949 million</td>
</tr>
</tbody>
</table>

¹Hospitals would incur certain costs associated with acuity tools on an ongoing basis (e.g., maintenance), while other costs are likely to be one-time costs (see slide 27). Figure does not include estimated costs for psychiatric/SUD hospitals.

²2018 Information for Voters, [http://www.sec.state.ma.us/ele/ele18/ballot_questions_18/quest_1.htm](http://www.sec.state.ma.us/ele/ele18/ballot_questions_18/quest_1.htm).

The estimated costs are likely to be **conservative** as they do not include any costs related to implementation in emergency departments, observation units, and outpatient departments, as well as other one-time costs. See next slide for additional information.
The estimated costs are likely to be conservative due to data limitations for additional units and other anticipated costs

**Ongoing annual costs not included:**

- Increased RN staffing costs from hospital units not included in the analysis:
  - Emergency departments (see also slide 28)
  - Outpatient departments
  - Observation units
- Increased RN staffing costs to non-acute hospitals *
- State agency implementation costs
- Penalties for non-compliance

**One-time costs not included:**

- Acuity tool costs
  - In addition to ongoing costs (see slide 26), hospitals would incur costs on a one-time basis (e.g., purchasing, initial development, and implementation costs)
  - HPC estimates $57.9 million in one-time acuity tool costs for acute care hospitals
- Turnover costs
  - Including recruitment, onboarding, and training
  - Recent literature suggests the range of average turnover costs could be $38,000 to $61,100 per bedside RN
  - For purposes of illustration, turnover of 1,000 RNs would cost $49.5 million

*Due to ambiguity about the application of the proposed initiative to certain non-acute hospitals (e.g., institutional rehabilitation facilities, long term care hospitals), these units are not included in the HPC’s current cost impact analysis.

The mandate would impact Massachusetts emergency departments

- The proposed initiative includes **mandated ratios in emergency departments (EDs) at all times:**
  - 1:1 for critical care or intensive care patients, or 1:2 if patient is stable
  - 1:2 for urgent non-stable patients
  - 1:3 for urgent stable patients
  - 1:5 for non-urgent stable patients

- The HPC was unable to include EDs in its cost impact analysis due to data limitations

- However, mandated ratios would impact EDs, including but not limited to the potential for significant impacts on:
  - Access to emergency care
  - Wait times
  - Patient flow
  - Boarding
  - Ambulance diversion
Potential cost savings

- Researchers estimate that an increase in RN staffing may be associated with savings from reduced hospital length of stay and reduced adverse events\(^1\)
  - ~$15,000 savings per additional FTE RN hired

- Extrapolating from this research, the HPC calculated a range of estimated potential savings of $34 to $47 million with the hiring of additional RNs
  - However, it is uncertain if RN staffing increases from current MA staffing levels would result in these savings

- Other savings could be realized due to reduced RN turnover\(^2\) and workforce injuries\(^3\)

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\(^1\)Needleman et al (2006). The authors estimated $1.72 billion in savings corresponding with a nationwide increase in 114,456 FTE RNs – i.e., if all hospitals increased staffing (if needed) to the level of the 75th percentile of all hospitals at that time.\(^2\)See, e.g., Aiken et al (2010); Spetz (2008). \(^3\)Leigh et al (2015). See Appendix for full citations.
Hospitals would have to recruit additional RNs to meet the mandate from various sources

- RNs working in other hospitals in MA
- RNs working in non-hospital care settings in MA
- New RN graduates
- Temporary/traveling RNs
- RNs from out of state
- RNs from other countries
- Part-time RNs who convert to full-time RNs
- RNs who delay retirement

2,286 – 3,101 estimated additional RNs required
Massachusetts has a tighter labor market for RNs than most other states

Projected surplus/deficit of RNs (%) in 2030 (HRSA)

New England has the slowest recent and projected growth of RNs (6%), stemming from greater retirements.

New England has the slowest workforce growth (6%), both recent and projected.

New England has the lowest % of RNs under age 40 and the highest % of RNs age 50+.

Implications for statewide health care spending

- If the proposed initiative becomes law, the increased costs to hospitals may result in impacts such as:
  - Reductions in hospital margins or assets\(^1\)
  - Reduced capital investments
  - Closure of unprofitable (and/or other) service lines
  - Reductions in non-health care workforce staffing levels

- These costs could also lead to higher commercial prices for hospital care, potentially leading to higher premiums

- Overall, the higher estimated annual costs of $676 million to $949 million represent:\(^2\)
  - 1.1 to 1.6% of total health care expenditures in Massachusetts in 2017 as measured for the purposes of performance against the health care cost growth benchmark; and
  - 2.4% to 3.5% of total hospital spending

\(^1\)Reiter et al (2012). See Appendix for full citation.
\(^2\)Total health care spending based on total estimated costs in Analyses A and B divided by total health care expenditures (THCE) as reported by the Center for Health Information and Analysis (CHIA) in CHIA’s 2018 Annual Report. Percentage of hospital spending includes acute and psychiatric hospital costs in Analyses A and B divided by total hospital spending as reported in CHIA’s 2018 Annual Report.
The HPC is dedicating a portion of the upcoming Health Care Cost Trends Hearing to the topic of mandated nurse-to-patient staffing ratios. The HPC’s findings will be presented at the hearing by Dr. David Auerbach and Dr. Joanne Spetz.

The goal of this panel is to discuss the implications of mandated nurse staffing ratios for the Commonwealth.

Topics will include:
- Evidence and experience of implementing hospital nurse staffing ratios in California
- The potential impact in Massachusetts on health care cost, quality, and access

Panel will feature participants with varied perspectives and expertise on the issue.

Ms. Vicki Bermudez, Regulatory Policy Specialist, California Nurses Association
Ms. Deborah Devaux, Chief Operating Officer, Blue Cross and Blue Shield of Massachusetts
Dr. Nancy Gaden, Senior Vice President and Chief Nursing Officer, Boston Medical Center
Dr. Judith Shindul-Rothschild, Associate Professor, William F. Connell School of Nursing, Boston College
Dr. Joanne Spetz, Professor, Institute for Health Policy Studies, University of California, San Francisco (UCSF)
APPENDIX
All staffing data and calculations reported on slide 20 were based on 2017 staffing report data from PatientCareLink by hospital unit, by service line, by shift, supplemented with staffing data obtained from the Massachusetts Health & Hospital Association (MHA) covering maternity care, operating rooms, and post-anesthesia care units. The HPC analysis used reported daily patient census averages combined with reported RN staffing by shift to assess average levels of staffing per shift over the course of a year.

When comparing these staffing levels to mandated ratios, in instances where units could be categorized in more than one way (e.g., pediatric behavioral health), HPC applied the more restrictive mandated ratio for consistency. For example, in a pediatric behavioral health unit, HPC applied a 1:4 ratio (for a pediatric unit) instead of a 1:5 ratio (for a behavioral unit).

Given data limitations, for labor/delivery units HPC applied an average ratio of 1:1.3 to account for variation in patient status and classification in such units, including antepartum and active labor.

For psychiatric/SUD hospitals, HPC used the aggregate estimate of nurses needed to meet the 1:5 mandated ratio obtained from the MHA (n=477), without additional adjustments. The HPC was unable to make any adjustments for “at all times” given the lack of unit and shift-level data for these hospitals.

HPC used an average of 37.5 hours (based on data from the American Community Survey) worked per week for RNs to convert hourly staffing counts to full time RNs. HPC staff applied adjustments for the “at all times” requirement as shown on slides 19-20 that assumed hospitals would have to staff shifts at 10% (Analysis A) or 20% (Analysis B) greater than the mandated ratio, on average, to account for meals, breaks, off-unit and non-productive time, and additional patient census variability.

HPC converted needed FTE RNs in HPC’s shift level analysis, as shown on slide 20, to total costs using average earnings for hospital and non-hospital RNs as estimated from the American Community Survey. HPC accounted for non-wage compensation using data from the Bureau of Labor Statistics (https://www.bls.gov/news.release/pdf/ecsec.pdf) indicating that wages account for roughly two-thirds of total RN compensation.

For estimates of wage impacts for RNs not in HPC’s shift level analysis, HPC estimated the number of FTE RNs in Massachusetts by setting (hospital and non-hospital) and average earnings using the American Community Survey. These estimates are on an FTE basis accounting for part-time RNs and exclude Nurse Practitioners and Certified Nurse Anesthetists.

The acuity tool cost estimate included in slide 26 represents ongoing cost (e.g., licensing, maintenance). The acuity tool estimate included in slide 27 represents a one-time cost (e.g., for initial development, implementation, and training). These estimates were calculated from an internal analysis using stakeholder data to develop a per-unit estimate, which was applied to other hospitals.
## Comparison of methodologies for estimating impact of the proposed initiative

<table>
<thead>
<tr>
<th>Analytic decisions to study workforce needed for compliance</th>
<th>Massachusetts Health Policy Commission</th>
<th>Mass Insight Global Partnerships and BW Research Partnership</th>
<th>Report from Judith Shindul-Rothschil, PhD, MSN, RN</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>RN staffing data source(s)</strong></td>
<td>PatientCareLink publicly available staffing report data (2017); Survey data on additional acute facility units at the shift level of a unit</td>
<td>PatientCareLink publicly available staffing report data (2017); Survey data on additional acute facility units at the shift-level of a unit</td>
<td>Low cost estimate: relying on MA/CA personnel comparisons: Proportion of RN FTEs to total hospital personnel FTEs in CA &amp; MA (CA calculated using 2011 AHA Hospital Survey; MA calculated from the 2016 AHA Hospital Survey)</td>
</tr>
<tr>
<td><strong>Units included in shift-level analyses</strong></td>
<td>Neonate intermediate, Pediatric, Medical/Surgical, Step-Down, Psychiatric, Rehabilitation units of acute hospitals (from PatientCareLink); Operating Room, Post-anesthesia, Labor/Delivery, Postpartum, Maternal Child (from survey data)</td>
<td>Neonate intermediate, Pediatric, Medical/Surgical, Step-Down, Psychiatric, Rehabilitation units of acute and some non-acute hospitals (from PatientCareLink); Operating Room, Post-anesthesia, Labor/Delivery, Postpartum, Maternal Child (from survey data)</td>
<td>High cost estimate: Using publicly available PatientCareLink staffing report data (2016 &amp; 2017)</td>
</tr>
<tr>
<td><strong>Units included in non-shift-level analyses</strong></td>
<td>Psychiatric/SUD hospitals</td>
<td>Emergency Department (aggregate costs estimated from survey completed by hospitals)</td>
<td>Not applicable</td>
</tr>
<tr>
<td><strong>Units excluded from shift-level analysis</strong></td>
<td>Emergency Department, Outpatient, Observation, Intensive Care, Non-acute hospitals</td>
<td>Emergency Department, Outpatient, Observation, Psychiatric/SUD hospitals, Intensive Care</td>
<td>Neonate intermediate, Pediatric, Psychiatric, Rehabilitation, Operating Room, Post-anesthesia, Labor/Delivery, Postpartum, Outpatient, Observation, Psychiatric/SUD hospitals, Intensive Care</td>
</tr>
<tr>
<td>Consideration of &quot;at all times&quot; requirement</td>
<td>10% (Analysis A); 20% (Analysis B)(^1)</td>
<td>17.5% - 20% adjustment for non-productive time; + additional adjustment for meal coverage; + additional 2 RNs per unit added on annual budget</td>
<td>Multiplied estimated additional FTE RNs (539) * 3 (multiplier intends to account for additional workforce needed to account for non-productive time and units where staffing data was not available for analysis) to arrive at 'at all times' estimate of 1,617 FTE RNs. Cost estimate does not reflect this workforce estimate, because of lack of hourly wage data.</td>
</tr>
<tr>
<td>Consideration of existing workforce vacancies</td>
<td>Not included</td>
<td>5.3%, or at least 1,200 RNs</td>
<td>Not included</td>
</tr>
<tr>
<td>Impact on RN workforce wages</td>
<td>4% (Analysis A); 6% (Analysis B)(^2)</td>
<td>3.5% for existing RNs; 7% for newly hired RNs (based on CA literature and existing labor agreements)</td>
<td>Not included</td>
</tr>
<tr>
<td>Cost accounting approach</td>
<td>Not included</td>
<td>Not included</td>
<td>Netted gross cost of estimate against existing reserves for some hospitals</td>
</tr>
<tr>
<td>Turnover costs</td>
<td>Qualitative cost reference: $38,000-$61,100 per position (NSI Nursing Solutions, Inc 2018 National Health Care Retention &amp; RN Staffing Report)</td>
<td>Recruitment costs: $86,162,371 (based on average cost from hospital survey data)</td>
<td>Not included</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Turnover costs: $249,074,359 (based on average cost from hospital survey data)</td>
<td>Not included</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Training reimbursement: $45,597,256 (based on average costs from public and private 2- and 4-year universities in MA)</td>
<td></td>
</tr>
<tr>
<td>Potential savings</td>
<td>Estimated potential savings related to reduction of adverse events $32-44 million (Needleman, 2006);</td>
<td>Not included</td>
<td>Not included</td>
</tr>
<tr>
<td>Acuity tool costs</td>
<td>Ongoing costs ($25.8 million) and initial implementation costs ($57.9 million) (internal analysis based on stakeholder data)</td>
<td>$58 million (from hospital survey data)</td>
<td>Not included</td>
</tr>
</tbody>
</table>

\(^1\) HPC assumption is based on ~6.5% for meal coverage and additional coverage based on expert judgment to account for ‘at all times’ mandate over and above staffing adjustments hospitals currently make using float pools, per-diem RNs and RNs from other units.

\(^2\) HPC staff relied on two papers using a difference-in-differences approach, Munnich (2014) and Mark et al (2009). HPC staff average the independent estimates from each of the five data sources in question. The sources do not identify a separate impact on existing or newly hired RNs. The impact on wages could be higher than that observed in California because of a shorter implementation timeline in Massachusetts, stricter enforcement and stricter ratios. The impact could be lower because California had a nursing shortage at the time of implementation of their staffing law which could have led to a larger wage increase than in comparison states.
Supporting data for HPC analysis

<table>
<thead>
<tr>
<th>Acute Hospital Type</th>
<th>Current number RNs</th>
<th>Difference between average staffing and proposed ratios</th>
<th>Analysis A</th>
<th>Analysis B</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Additional RNs for compliance [Workforce percentage, %]</td>
<td>Additional RNs for compliance [Workforce percentage, %]</td>
<td>Additional RNs for compliance [Workforce percentage, %]</td>
</tr>
<tr>
<td>AMC</td>
<td>5004</td>
<td>119 [2%]</td>
<td>227 [5%]</td>
<td>371 [7%]</td>
</tr>
<tr>
<td>Community-HPP</td>
<td>4548</td>
<td>640 [14%]</td>
<td>963 [21%]</td>
<td>1342 [30%]</td>
</tr>
<tr>
<td>Community</td>
<td>2236</td>
<td>202 [9%]</td>
<td>316 [14%]</td>
<td>443 [20%]</td>
</tr>
<tr>
<td>Specialty</td>
<td>990</td>
<td>28 [3%]</td>
<td>42 [4%]</td>
<td>64 [7%]</td>
</tr>
<tr>
<td>Teaching</td>
<td>2234</td>
<td>158 [7%]</td>
<td>261 [12%]</td>
<td>403 [18%]</td>
</tr>
<tr>
<td>Operating Room</td>
<td>1335</td>
<td>3 [0.2%]</td>
<td>4 [0.3%]</td>
<td>8 [0.6%]</td>
</tr>
<tr>
<td>Post-anesthesia</td>
<td>980</td>
<td>8 [0.9%]</td>
<td>13 [1%]</td>
<td>22 [2%]</td>
</tr>
<tr>
<td>Labor/Delivery</td>
<td>998</td>
<td>223 [22%]</td>
<td>277 [28%]</td>
<td>334 [33%]</td>
</tr>
<tr>
<td>Postpartum</td>
<td>942</td>
<td>10 [1%]</td>
<td>15 [2%]</td>
<td>21 [2%]</td>
</tr>
<tr>
<td>Neonate intermediate</td>
<td>286</td>
<td>81 [29%]</td>
<td>112 [39%]</td>
<td>143 [50%]</td>
</tr>
<tr>
<td>Pediatric</td>
<td>1180</td>
<td>29 [2%]</td>
<td>48 [4%]</td>
<td>72 [6%]</td>
</tr>
<tr>
<td>Medical/Surgical</td>
<td>7314</td>
<td>454 [6%]</td>
<td>837 [11%]</td>
<td>1336 [18%]</td>
</tr>
<tr>
<td>Step-Down</td>
<td>916</td>
<td>87 [9%]</td>
<td>148 [16%]</td>
<td>218 [24%]</td>
</tr>
<tr>
<td>Psychiatric</td>
<td>989</td>
<td>232 [23%]</td>
<td>327 [33%]</td>
<td>434 [44%]</td>
</tr>
<tr>
<td>Rehabilitation</td>
<td>74</td>
<td>19 [26%]</td>
<td>27 [37%]</td>
<td>36 [49%]</td>
</tr>
<tr>
<td>Overall</td>
<td>15012</td>
<td>1148 [8%]</td>
<td>1809 [12%]</td>
<td>2624 [17%]</td>
</tr>
</tbody>
</table>

Community-HPP designates a “High Public Payer Community Hospital.” These are community hospitals that are disproportionately reliant upon public revenues by virtue of a public payer mix of 63% or greater. Public payers include Medicare, MassHealth and other government payers including the Health Safety Net. Source: CHIA.
References