

# **JOINT STATE GOVERNMENT COMMISSION**

**General Assembly of the Commonwealth of Pennsylvania**

## **PROFESSIONAL BEDSIDE NURSING IN PENNSYLVANIA:**

**A STAFF STUDY**

**June 2015**



*Serving the Pennsylvania General Assembly Since 1937*

**REPORT**

*Professional Bedside Nursing in Pennsylvania*

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The Joint State Government Commission was created in 1937 as the primary and central non-partisan, bicameral research and policy development agency for the General Assembly of Pennsylvania.<sup>1</sup>

A fourteen-member Executive Committee comprised of the leadership of both the House of Representatives and the Senate oversees the Commission. The seven Executive Committee members from the House of Representatives are the Speaker, the Majority and Minority Leaders, the Majority and Minority Whips, and the Majority and Minority Caucus Chairs. The seven Executive Committee members from the Senate are the President Pro Tempore, the Majority and Minority Leaders, the Majority and Minority Whips, and the Majority and Minority Caucus Chairs. By statute, the Executive Committee selects a chairman of the Commission from among the members of the General Assembly. Historically, the Executive Committee has also selected a Vice-Chair or Treasurer, or both, for the Commission.

The studies conducted by the Commission are authorized by statute or by a simple or joint resolution. In general, the Commission has the power to conduct investigations, study issues, and gather information as directed by the General Assembly. The Commission provides in-depth research on a variety of topics, crafts recommendations to improve public policy and statutory law, and works closely with legislators and their staff.

A Commission study may involve the appointment of a legislative task force, composed of a specified number of legislators from the House of Representatives or the Senate, or both, as set forth in the enabling statute or resolution. In addition to following the progress of a particular study, the principal role of a task force is to determine whether to authorize the publication of any report resulting from the study and the introduction of any proposed legislation contained in the report. However, task force authorization does not necessarily reflect endorsement of all the findings and recommendations contained in a report.

Some studies involve an appointed advisory committee of professionals or interested parties from across the Commonwealth with expertise in a particular topic; others are managed exclusively by Commission staff with the informal involvement of representatives of those entities that can provide insight and information regarding the particular topic. When a study involves an advisory committee, the Commission seeks consensus among the members.<sup>2</sup> Although an advisory committee member may represent a particular department, agency, association, or group, such representation does not necessarily reflect the endorsement of the department, agency, association, or group of all the findings and recommendations contained in a study report.

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<sup>1</sup> Act of July 1, 1937 (P.L.2460, No.459) (46 P.S. § 65), amended by the act of June 26, 1939 (P.L.1084, No.380); the act of March 8, 1943 (P.L.13, No.4); the act of May 15, 1956 (1955 P.L.1605, No.535); the act of December 8, 1959 (P.L.1740, No.646); and the act of November 20, 1969 (P.L.301, No.128).

<sup>2</sup> Consensus does not necessarily reflect unanimity among the advisory committee members on each individual policy or legislative recommendation. However, it does, at a minimum, reflect the views of a substantial majority of the advisory committee, gained after lengthy review and discussion.

Over the years, nearly one thousand individuals from across the Commonwealth have served as members of the Commission's numerous advisory committees or have assisted the Commission with its studies. Members of advisory committees bring a wide range of knowledge and experience to deliberations involving a particular study. Individuals from countless backgrounds have contributed to the work of the Commission, such as attorneys, judges, professors and other educators, state and local officials, physicians and other health care professionals, business and community leaders, service providers, administrators and other professionals, law enforcement personnel, and concerned citizens. In addition, members of advisory committees donate their time to serve the public good; they are not compensated for their service as members. Consequently, the Commonwealth of Pennsylvania receives the financial benefit of such volunteerism, along with the expertise in developing statutory language and public policy recommendations to improve the law in Pennsylvania.

The Commission periodically reports its findings and recommendations, along with any proposed legislation, to the General Assembly. Certain studies have specific timelines for the publication of a report, as in the case of a discrete or timely topic; other studies, given their complex or considerable nature, are ongoing and involve the publication of periodic reports. Completion of a study, or a particular aspect of an ongoing study, generally results in the publication of a report setting forth background material, policy recommendations, and proposed legislation. However, the release of a report by the Commission does not necessarily reflect the endorsement by the members of the Executive Committee, or the Chair or Vice-Chair of the Commission, of all the findings, recommendations, or conclusions contained in the report. A report containing proposed legislation may also contain official comments, which may be used in determining the intent of the General Assembly.<sup>3</sup>

Since its inception, the Commission has published more than 350 reports on a sweeping range of topics, including administrative law and procedure; agriculture; athletics and sports; banks and banking; commerce and trade; the commercial code; crimes and offenses; decedents, estates, and fiduciaries; detectives and private police; domestic relations; education; elections; eminent domain; environmental resources; escheats; fish; forests, waters, and state parks; game; health and safety; historical sites and museums; insolvency and assignments; insurance; the judiciary and judicial procedure; labor; law and justice; the legislature; liquor; mechanics' liens; mental health; military affairs; mines and mining; municipalities; prisons and parole; procurement; state-licensed professions and occupations; public utilities; public welfare; real and personal property; state government; taxation and fiscal affairs; transportation; vehicles; and workers' compensation.

Following the completion of a report, subsequent action on the part of the Commission may be required, and, as necessary, the Commission will draft legislation and statutory amendments, update research, track legislation through the legislative process, attend hearings, and answer questions from legislators, legislative staff, interest groups, and constituents.

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<sup>3</sup> 1 Pa.C.S. § 1939 ("The comments or report of the commission . . . which drafted a statute may be consulted in the construction or application of the original provisions of the statute if such comments or report were published or otherwise generally available prior to the consideration of the statute by the General Assembly").



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Vice Chairman

June 30, 2015

***Dear Members of the General Assembly of Pennsylvania:***

The Commission is pleased to announce the release of the staff report on *Professional Bedside Nursing in Pennsylvania: a Staff Study*, in response to House Resolution No. 920 of 2014 that directed the Joint State Government Commission to conduct a study on the staffing levels of professional bedside nurses in Pennsylvania hospitals.

This report describes the demographics of Pennsylvania's nurse workforce, including the length of employment for Pennsylvania nurses. It presents information on the lengths of shifts and overtime as reported by nurses, and on staffing levels as reviewed over different shifts and across all types of hospital units. The report discusses the association between hospital nurse staffing levels, work conditions, and patient outcomes, while emphasizing that this is one of the many factors that influence outcomes.

The report includes recommendations for improving the quality of care through changes to Pennsylvania laws, practices, and policies and procedures that are reflective of the available data related to professional bedside nurse staffing.

The report is available on our website, <http://jsg.legis.state.pa.us>.

Sincerely,

Glenn Pasewicz  
Executive Director

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## *Acknowledgements*

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The Center for Health Outcomes and Policy Research (CHOPR) is a research and research training enterprise focusing on the outcomes of health care and health workforce policy. Established in 1989, the Center is a unique community within the School of Nursing drawing together faculty, students, and pre- and post-doctoral fellows from nursing, sociology, demography, medicine, management, economics, and other related disciplines. With collaborators from around the world, Center researchers study health system reorganization and policy changes and aim to produce research evidence to improve the quality of health care. The Leonard Davis Institute of Health Economics brings together Penn's substantial faculty and research expertise in health policy analysis and is one of the nation's foremost health policy research centers.

Dr. Aiken and Dr. McHugh provided an enormous amount of pertinent data on hospital nurse staffing since the late 1990's, which is widely regarded as an authoritative resource. Their peer-reviewed research funded through grants from the National Institutes of Health and the Robert Wood Johnson Foundation (RWJF), was courteously made available to JSGC. The generosity of Dr. Aiken and Dr. McHugh, supported by the Leonard Davis Institute of Health Economics, significantly aided in the completion of JSGC's final report.





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## INTRODUCTION

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House Resolution No. 920 of 2014 directed the Joint State Government Commission (JSGC) to conduct a study on the staffing levels of professional bedside nurses in Pennsylvania hospitals. The findings of the report were to include the following: recent reports of serious adverse events in hospitals and the connection these adverse events have to professional bedside nurse staffing; demographics and length of stay; lengths of shifts and overtime requirements; staffing levels that are implemented on a regular and consistent basis in a variety of hospitals in this Commonwealth, reviewed over differing shifts and across all hospital units; and recommendations to implement potential changes in State laws, practices, policies and procedures relating to professional nurse staffing. The resolution directed the JSGC to study nurse staffing and its connection to adverse events, not all factors that contribute to adverse events.

The Health Care Facilities Act,<sup>4</sup> delineates requirements for hospital licensure, and regulations for nursing services are located in Pennsylvania Code Title 28, Chapter 109.

“A sufficient number of registered professional nurses shall be on duty at all times to plan, assign, supervise, and evaluate nursing care as well as to give patients such nursing care as requires the judgment and specialized skills of a registered nurse. A graduate nurse, or graduate practical nurse, providing care shall be under the supervision of a registered nurse.”<sup>5</sup>

Due to the vague nature of the language, hospitals staff their facilities at the levels they deem fit. However, current staffing practices may not be adequate to deliver proper care, potentially leading to preventable adverse events.

This report describes the following: an association between nurse staffing levels, and the conditions in which they work, with adverse outcomes for patients; demographics of Pennsylvania’s nurse workforce; length of stay for Pennsylvania nurses; and lengths of shifts and overtime requirements. The report compiles as much data as available on Pennsylvania nurse staffing levels implemented in a variety of hospitals in this Commonwealth, reviewed over differing shifts and across all hospital units. The report concludes with statistical based recommendations for potential changes in State laws, practices, policies and procedures relating to professional nurse staffing.

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<sup>4</sup> Act of July 19, 1979 (P.L.130, No.48).

<sup>5</sup> 28 Pa. Code Ch. 109.



## SUMMARY OF RECOMMENDATIONS

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The evidence reviewed in this study demonstrates a clear relationship between nurse staffing and patient outcomes. Although there is not an overall shortage of nurses in Pennsylvania, Pennsylvania hospitals vary significantly from one to the next in terms of nurse staffing, which contributes to disparities in quality of care across the state. This variation is much greater than can be justified by differences in patient need and is not in the public interest.

The report recommendations are based on the statistics and research made available to JSGC and are discussed in detail in the substantive chapters of this report. The recommendations below focus on improving patient safety across all Pennsylvania hospitals. The cross-references to the pages containing the background and rationale are provided for each recommendation.

### **Recommendation 1**

*Pennsylvania should improve nurse workforce data collection and analysis.*

### **Recommendation 2**

*Pennsylvania should consider implementing a public reporting system for hospital staffing levels.*

### **Recommendation 3**

*Hospitals should consider consistency of nurse staffing during “off-shifts” (nights, weekends, holidays).*

### **Recommendation 4**

*Pennsylvania hospitals should make improvements to the nurse work environment.*

### **Recommendation 5**

*Pennsylvania should Increase the percent of nurses with a Bachelor’s of Science Degree in Nursing.*

### **Recommendation 6**

*Pennsylvania should extend the whistleblower protection law to include nurses.*



## ADVERSE EVENTS

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Patient safety in Pennsylvania is a complex issue that will not be improved with a single solution. Though Pennsylvania has made progress, including the implementation of the Patient Safety Reporting System (PA-PSRS)<sup>6</sup>, which has aided in the reduction of high-harm adverse events by 45 percent since its implementation, adverse events continue to occur.<sup>7</sup> In 2014, a total of 240,778 Serious Events<sup>8</sup> and Incidents<sup>9</sup> were reported to PA-PSRS.

Not only are adverse events detrimental to patients, the cost of hospital-acquired infections (HAIs), readmissions, and other medical errors in the United States was \$19.5 billion in 2008.<sup>10</sup> To further reduce adverse events and excess costs, Pennsylvania hospitals should consider the large body of evidence that suggests that proper nurse staffing, in conjunction with a good work environment, plays a major role in patient safety.

### *Hospital-Acquired Infections*

HAIs are preventable complications patients may suffer from while receiving medical treatment in a healthcare facility. These infections are not only financially costly to both the patient and the hospital, they cause avoidable disability and may even result in the death of patients. In 2011, there were an estimated 721,800 infections occurring in acute care hospitals in the United States.<sup>11</sup>

Nurse staffing and the conditions in which they work set the stage for many hospital-acquired infections. Inadequate staffing levels have been linked to a number of HAIs, some of which include urinary tract infections, surgical site infections and pneumonia<sup>12</sup>-the most common

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<sup>6</sup> PA-PSRS is a web-based system that permits healthcare facilities to submit reports on Serious Events and Incidents  
<sup>7</sup> “2014 Annual Report”, Pennsylvania Patient Safety Authority, April 30, 2015.

[http://patientsafetyauthority.org/PatientSafetyAuthority/Documents/Annual\\_Report\\_2014.pdf](http://patientsafetyauthority.org/PatientSafetyAuthority/Documents/Annual_Report_2014.pdf).

<sup>8</sup> An adverse event resulting in patient harm. The act of March 20, 2002 (P.L.154, No.13), known as the “Medical Care Availability and Reduction of Error (Mcare) Act, defines this as “An event, occurrence or situation involving the clinical care of a patient in a medical facility that results in death or compromises patient safety and results in an unanticipated injury requiring the delivery of additional health care services to the patient. The term does not include an incident.”

<sup>9</sup> A “near miss” in which the patient was not harmed. The Mcare Act defines this as: “An event, occurrence or situation involving the clinical care of a patient in a medical facility which could have injured the patient but did not either cause an unanticipated injury or require the delivery of additional health care services to the patient. The term does not include a Serious Event.”

<sup>10</sup> Jon Shreve, et al., “The Economic Measurement of Medical Errors, sponsored by Society of Actuaries Health Section,” prepared by Milliman Inc., Schaumburg, IL (June 2010).

<sup>11</sup> Shelley Magill, et al., “Multistate Point-Prevalence Survey of Health Care–Associated Infections,” *N Engl J Med* 2014;370:1198-208.

<sup>12</sup> JP Cimiotti, et al., “Nurse staffing, burnout, and health care–associated infection,” *Am. J. Infect. Control.* 2012;40(6):486-490; Jack Needleman, et al., “Nurse-staffing levels and the quality of care in hospitals,” *N. Engl. J. Med.* May 30 2002;346(22):1715-1722; Lynn Unruh, “Licensed Nurse Staffing and Adverse Events in Hospitals,”

HAI.<sup>13</sup> In addition, insufficient staffing may interfere with important infection prevention measures, such as frequent wound dressing, inspection, and changing; hand-washing; and timely antibiotic administration.

Nurse burnout may also be leading to preventable HAIs. One study suggested that a reduction in nurse burnout of 10 percent would translate into 1,335 prevented urinary tract infections and 744 prevented surgical site infections. The reduction in these two HAIs, which are typically found among low-risk populations, could save between \$9 million and \$23 million annually. Moreover, if burnout were reduced by 30 percent, this could translate into savings of nearly \$28 million to more than \$69 million.<sup>14</sup>

In 2014, facilities in Pennsylvania submitted 28,825 infection reports through PA-PSRS. This was a 6.9 percent decrease from 2013. It was cited that the decrease may have resulted from changes in criteria stemming from the new reporting requirements.<sup>15</sup>

### *Mortality & Failure-to-Rescue*

Nurse staffing levels have been consistently associated with patient mortality and failure-to-rescue (FTR), which is defined as the inability to prevent a clinically important deterioration, such as death or permanent disability, from a complication of an underlying illness, or a complication of medical care.<sup>16</sup> Hospitals with lower nurse-to-patient ratios are associated with higher inpatient mortality<sup>17</sup> and 30-day mortality.<sup>18</sup> One of the seminal reports on nurse staffing within Pennsylvania hospitals found that for each additional patient per nurse, there was a seven

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*Med. Care.* Jan 2003;41(1):142-152; David Thompson, et al., "Impact of Nursing Staffing on Patient Outcomes in Intensive Care Unit," *Journal of Nursing & Care*; Patricia Stone, et al., "Nurses' Working Conditions: Implications for Infectious Disease," *Emerg. Infect. Dis.* Nov 2004;10(11):1984-1989; Deborah Dang, et al., "Postoperative complications: does intensive care unit staff nursing make a difference?" *Heart & Lung: The Journal of Acute and Critical Care.* 2002;31(3):219-228; Peter Pronovost, et al., "Organizational Characteristics of Intensive Care Units Related to Outcomes of Abdominal Aortic Surgery," *JAMA.* Apr 14 1999;281(14):1310-1317.

<sup>13</sup> G Duce, et al., "Prevention of hospital acquired infections: a practical guide," *World Health Organization*; 2002.

<sup>14</sup> JP Cimiotti, et al., "Nurse staffing, burnout, and health care-associated infection," *Am. J. Infect. Control.* 2012;40(6):486-490

<sup>15</sup> *Supra* note 7.

<sup>16</sup> Robert Kane, et al., "The Association of Registered Nurse Staffing Levels and Patient Outcomes: Systematic Review and Meta-Analysis," *Med. Care.* 2007;45(12):1195-1204; Tom Lang, et al., "Nurse-patient ratios: a systematic review on the effects of nurse staffing on patient, nurse employee, and hospital outcomes," *J. Nurs. Adm.* Jul-Aug 2004;34(7-8):326-337; A Kazanjian, et al., "Effect of the hospital nursing environment on patient mortality: a systematic review," *Journal of Health Services & Research Policy.* Apr 2005;10(2):111-117; CW Brennan, et al., "State of the Science The Relationship Between Nurse Staffing and Patient Outcomes," *West. J. Nurs. Res.* 2013.

<sup>17</sup> Jack Needleman, et al., "Nurse staffing and inpatient hospital mortality," *N. Engl. J. Med.* 2011;364(11):1037-1045.

<sup>18</sup> Linda Aiken, et al., "Hospital Nurse Staffing and Patient Mortality, Nurse Burnout, and Job Dissatisfaction," *JAMA.* 2002;288(16):1987-1993; Kelly Wiltse Nicely, et al., "Lower Mortality for Abdominal Aortic Aneurysm Repair in High-Volume Hospitals Is Contingent upon Nurse Staffing," *Health Serv. Res.* 2013;48(3):972-991; Julie Sochalski, et al., "Will Mandated Minimum Nurse Staffing Ratios Lead to Better Patient Outcomes?" *Medical Care.* 2008;46(6):606-613; J. Margo Brooks Carthon, et al., "Nurse Staffing and Postsurgical Outcomes in Black Adults," *Journal of the American Geriatrics Society,* 2012;60(6):1078-1084.



percent increase in the likelihood that a patient would die within 30 days of admission.<sup>19</sup> FTR was also shown to increase by seven percent for each additional patient per nurse.<sup>20</sup>

In 2014, the Patient Safety Authority received 208 reports of events that “may have contributed to or resulted in the patient’s death from acute-level facilities.” This was a 5.9 percent decrease from 2013. Patient death accounted for less 0.1 percent of all submitted reports.<sup>21</sup>

### *Readmissions*

Readmissions have increasingly gained attention as adverse outcomes, in part because of the policy focus on them as part of the Affordable Care Act (ACA). Under the ACA’s Hospital Readmissions Reduction Program, the Centers for Medicare and Medicaid Services (CMS) financially penalizes hospitals that have excess readmissions for certain patient populations due to the high costs associated with them. This currently includes patients with heart failure, acute myocardial infarction, pneumonia, chronic obstructive pulmonary disease, as well as total hip arthroplasty and total knee arthroplasty surgeries.

In addition to being a source of preventable costs, readmissions signal low quality of care and have real consequences for patients. Readmissions jeopardize health, particularly for the elderly, who are increasingly put at risk for loss of function, HAIs, and other poor outcomes each time they enter the hospital. Evidence shows that nurse staffing is associated with readmissions for heart failure, myocardial infarction, pneumonia, and surgical patients.<sup>22</sup> McHugh, et al. found that each additional patient per nurse in the average nurse’s workload increased the odds of readmission by seven percent for heart failure patients, six percent for pneumonia patients, and nine percent for myocardial infarction patients.<sup>23</sup>

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<sup>19</sup> Linda Aiken, et al., “Hospital nurse staffing and patient mortality, nurse burnout, and job dissatisfaction,” *JAMA*. Oct 23-30 2002;288(16):1987-1993.

<sup>20</sup> Linda Aiken, et al., “Hospital Nurse Staffing and Patient Mortality, Nurse Burnout, and Job Dissatisfaction,” *JAMA*. 2002;288(16):1987-1993; Kelly Wiltse Nicely, et al., “Lower Mortality for Abdominal Aortic Aneurysm Repair in High-Volume Hospitals Is Contingent upon Nurse Staffing,” *Health Serv. Res.* 2013;48(3):972-991; Julie Sochalski, et al., “Will Mandated Minimum Nurse Staffing Ratios Lead to Better Patient Outcomes?” *Medical Care*. 2008;46(6):606-613; J. Margo Brooks Carthon, et al., “Nurse Staffing and Postsurgical Outcomes in Black Adults,” *Journal of the American Geriatrics Society*. 2012;60(6):1078-1084; Jean Seago, et al., “Longitudinal analyses of nurse staffing and patient outcomes: more about failure-to-rescue,” *J. Nurs. Adm.* Jan 2006;36(1):13-21.

<sup>21</sup> *Supra* note 7.

<sup>22</sup> Chenjuan Ma, et al., “Organization of hospital nursing and 30-day readmissions in Medicare patients undergoing surgery,” *Med. Care*. 2015; 53(1):65-70; Matthew McHugh, et al., “Hospital Nursing and 30-Day Readmissions among Medicare Patients with Heart Failure, Acute Myocardial Infarction, and Pneumonia,” *Med Care*. 2013;51(1):52-59.

<sup>23</sup> Matthew D. McHugh, et al., “Hospital Nursing and 30-Day Readmissions among Medicare Patients with Heart Failure, Acute Myocardial Infarction, and Pneumonia,” *Med Care*. 2013;51(1):52-59.

Hospitals with better nurse staffing are also less likely to be penalized under the CMS Hospital Readmissions Reduction Program.<sup>24</sup> High nurse staffing levels allow nurses to provide essential care and patient education that lowers readmission risk.<sup>25</sup> Evidence shows that, when nurses are not able to provide this care due to insufficient staffing and competing demands, patients are more likely to be readmitted.<sup>26</sup> In addition, many of the targeted programs aimed at reducing readmissions, such as transitional care, comprehensive discharge planning and care coordination, and home telehealth, rely on nurses to carry them out.<sup>27</sup> Therefore, if staffing is insufficient when these programs are put in place, the likelihood of them being effective is low.

The work environment also plays a significant role in 30-day readmissions. Researchers have found that in hospitals with a good work environment, compared to a poor work environment, heart failure patients were 7 percent less likely to be readmitted, acute myocardial infarction patients were 6 percent less likely to be readmitted, and pneumonia patients were 10 percent less likely to be readmitted. On average, hospitals with the best work environments had higher nurse-to-patient ratios and higher proportions of nurses with a BSN compared to other hospitals. In all cases, the probability of readmission would be decidedly lower if both workloads were less and nurses' work environment was better. However, though nurse education was statistically significant for patients with pneumonia, where each additional 10 percent of nurses with a BSN translated into a 3 percent lower odds of readmission, it was not for heart failure or acute myocardial infarction.<sup>28</sup>

### *Patient Satisfaction*

There has also been an increasing emphasis on patient satisfaction surveys in an effort to provide patient-centered care. CMS, which includes hospital performance on patient rating of their hospital experience in their Value-Based Purchasing Program, incentivizes hospitals by attaching payment to quality performance. A number of studies, including three that used data from Pennsylvania, found that patient satisfaction was significantly associated with nurse staffing levels.<sup>29</sup> Another found that differences in nurse staffing often explained the generally lower levels

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<sup>24</sup> Matthew McHugh, et al., "Hospitals with higher nurse staffing had lower odds of readmissions penalties than hospitals with lower staffing," *Health Aff (Millwood)*. 2013;32(10):1740-1747.

<sup>25</sup> Marianne Weiss, et al., "Nurse and Patient Perceptions of Discharge Readiness in Relation to Post-Discharge Utilization," *Med. Care*. May 2010;48(5):482-486; Marianne Weiss, et al., "Quality and Cost Analysis of Nurse Staffing, Discharge Preparation, and Post-Discharge Utilization," *Health Serv. Res.* 2011;46(5):1473-1494.

<sup>26</sup> J. Margo Brooks Carthon, et al., "The quality of hospital work environments and missed nursing care is linked to heart failure readmissions: a cross-sectional study of US hospitals," *BMJ Quality & Safety*. February 11, 2015 2015.

<sup>27</sup> Mary Naylor, et al., "Comprehensive Discharge Planning and Home Follow-up of Hospitalized Elders: a Randomized Clinical Trial," *JAMA*. Feb 17 1999;281(7):613-620; Christopher Phillips, et al., "Comprehensive Discharge Planning with Postdischarge Support for Older Patients with Congestive Heart Failure: A Meta-Analysis," *JAMA*. 2004;291:1358-1367; Bonnie Wakefield, et al., "Evaluation of Home Telehealth Following Hospitalization for Heart Failure: A Randomized Trial," *Telemedicine and e-Health*. 2008;14(8):753-761.

<sup>28</sup> Matthew McHugh, and Chenjuan Ma, "Hospital Nursing and 30-Day Readmissions among Medicare Patients with Heart Failure, Acute Myocardial Infarction, and Pneumonia," *Med Care*. 2013;51(1):52-59.

<sup>29</sup> Jean Seago, et al., "Longitudinal analyses of nurse staffing and patient outcomes: more about failure-to-rescue," *J. Nurs. Adm.* Jan 2006;36(1):13-21; Geneva: World Health Organization; 2002; Matthew McHugh, et al., "Nurses' widespread job dissatisfaction, burnout and frustration with health benefits signal problems for patient care," *Health Aff (Millwood)*. February 2011;30(2):202-210; Kutney-Lee A, McHugh MD, Sloane DM, et al., "Nursing: a key to patient satisfaction," *Health Aff (Millwood)*. Jun 12 2009;28(4):w669-w677; Brooks-Carthon JM, Ann Kutney-Lee, et al., "Quality of care and patient satisfaction in hospitals with high concentrations of black patients," *Journal of*

of patient satisfaction observed in hospitals that care for large proportions of minority patients.<sup>30</sup> Studies also suggest that overall measures of patient satisfaction are largely explained specifically by patients' experience of communication with nurses.<sup>31</sup>

### *Other Adverse Events*

Various studies have found relationships between nurse staffing and other adverse patient outcomes. Two common adverse events, falls and pressure ulcers, which are highly preventable and common among older adults, are more likely to occur when staffing is poor.<sup>32</sup> Nurses are responsible for helping patients walk for the first time after procedures (when the risk of falling is highest) and monitoring them thereafter. Nurses must also monitor patients at high risk of falling due to muscle weakness from increased time spent in bed or medications that affect balance and cause dizziness.<sup>33</sup> Additionally, falls often result in longer patient stays due to fractures, skin tears, internal bleeding, or head injury; however, CMS is no longer paying for excess costs due to hospital falls. Moreover, nurses are responsible for most pressure ulcer prevention efforts, such as frequent and close surveillance of skin integrity, assessment of nutritional status and intervention, and frequent patient repositioning to reduce pressure.<sup>34</sup> Insufficient staffing may interfere with nurses' ability to monitor patients properly, leading to unwanted occurrences.

In 2013, Pennsylvania healthcare facilities reported 33,545 events involving skin integrity to PA-PSRS; the majority of these events (56.7 percent) were hospital-reported pressure ulcers. Subsequently, in March of 2015, the Patient Safety Authority reported that hospital-acquired pressure ulcers were a top concern for Pennsylvania hospitals. Improved staffing levels have the potential to reduce these adverse events.

Furthermore, wrong site surgeries, which are medical errors resulting in procedures being performed at the wrong site, procedures performed on the wrong person, incorrect procedures being performed at a site, or procedures that are more invasive than intended, are of great concern. Though wrong-site surgeries are rare events, the outcomes can be devastating to the patients. The Joint Commission<sup>35</sup> found that 70 percent of the time communication failure was the top root

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*Nursing Scholarship*. 2011;43(3):301-310; Linda Bolton LB, et al., "Nurse staffing and patient perceptions of nursing care," *J. Nurs. Adm.* Nov 2003;33(11):607-614.

<sup>30</sup> J. Margo Brooks Carthon, et al., "Quality of care and patient satisfaction in hospitals with high concentrations of black patients," *Journal of Nursing Scholarship*. 2011;43(3):301-310.

<sup>31</sup> Heather Farley, et al., "Patient satisfaction surveys and quality of care: An information paper," *Ann. Emerg. Med.* 2014; Marc Elliott M, et al., "Components of care vary in importance for overall patient-reported experience by type of hospitalization," *Med. Care*. 2009;47(8):842; Marc Elliott, et al., "Hospital survey shows improvements in patient experience," *Health Aff.* 2010;29(11):2061-2067.

<sup>32</sup> Lynn Unruh, "Licensed Nurse Staffing and Adverse Events in Hospitals," *Med. Care*. Jan 2003;41(1):142-152; Jack Needleman, et al., "Nurse-staffing levels and the quality of care in hospitals," *N. Engl. J. Med.* May 30 2002;346(22):1715-1722; Marc Elliott, et al., "Hospital survey shows improvements in patient experience," *Health Aff.* 2010;29(11):2061-2067; Eileen Lake, et al., "Patient falls: Association with hospital Magnet status and nursing unit staffing," *Res. Nurs. Health.* 2010;33(5):413-425.

<sup>33</sup> Currie LM. Fall and injury prevention. In: Agency for Healthcare Research and Quality, ed. *Patient safety and quality. an evidence-based handbook for nurses. AHRQ Publication No. 08-0043*. Rockville, MD: Agency for Healthcare Research and Quality; 2008.

<sup>34</sup> Madhuri Reddy, et al., "Preventing pressure ulcers: a systematic review," *JAMA*. 2006;296(8):974-984.

<sup>35</sup> The Joint Commission is an independent, not-for-profit organization, which accredits and certifies more than 20,500 health care organizations and programs in the United States. Joint Commission accreditation and certification is

cause, though staffing has been identified as a system factor in wrong-site surgeries.<sup>36</sup> As of 2013, and since July 2004, 550 wrong-site surgery events were reported through PA-PSRS.<sup>37</sup>

## Other Adverse Event Factors

### *Nurse Education*

Though focus has been placed on nurse staffing, there are other areas to consider to enhance nurse working conditions to improve patient outcomes. For example, evidence suggests that increasing the proportion of nurses with at least a bachelor's degree in nursing can yield better patient outcomes.<sup>38</sup> One of these studies found that hospitals with a higher percentage of RNs with a BSN or higher degree had lower rates of congestive heart failure mortality, decubitus ulcers, FTR, postoperative deep vein thrombosis or pulmonary embolism, and shorter length of stay.

### *The Nurse Work Environment*

Furthermore, and as mentioned above, the nurse work environment is an important factor in patient safety. The Institute of Medicine report, *Keeping Patients Safe: Transforming the Work Environment of Nurses*,<sup>39</sup> was dedicated to the issue of nurse work environments and their essential role in ensuring good outcomes for patients. Good work environments involve nurses in decision making at all levels, empower nurses to practice and make decisions within their scope of practice autonomously, foster good relationships between nurses and physicians, have supportive nurse managers and leaders, and have sufficient staffing and resources. Patients cared for in hospitals with good work environments are more satisfied with their hospital experience and have better outcomes, including mortality, HAIs, and readmissions, than similar patients cared for in hospitals

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recognized nationwide as a symbol of quality that reflects an organization's commitment to meeting certain performance standards.

<sup>36</sup> Deborah Mulloy, et al., "Wrong-Site Surgery: A Preventable Medical Error," In: Hughes RG, editor. *Patient Safety and Quality: An Evidence-Based Handbook for Nurses*. Rockville (MD): Agency for Healthcare Research and Quality (US); 2008 Apr. Chapter 36. Available from: <http://www.ncbi.nlm.nih.gov/books/NBK2678/>

<sup>37</sup> "2013 Annual Report," Pennsylvania Patient Safety Authority, April 30, 2014.

<sup>38</sup> Ann Kutney-Lee, et al., "An increase in the number of nurses with baccalaureate degrees is linked to lower rates of postsurgery mortality," *Health Aff.* 2013;32(3):579-586; Linda Aiken, et al., "Educational levels of hospital nurses and surgical patient mortality," *JAMA*. Sep 24 2003;290(12):1617-1623; Olga Yakusheva, et al., "Economic evaluation of the 80% baccalaureate nurse workforce recommendation: a patient-level analysis," *Med. Care*. 2014;52(10):864-869; Mary Blegen, et al., "Baccalaureate Education in Nursing and Patient Outcomes," *J. Nurs. Adm.* 2013;43(2):89-94 10.1097/NNA.1090b1013e31827f32028.

<sup>39</sup> Institute of Medicine, "Keeping Patients Safe: Transforming the Work Environment of Nurses," Washington, DC: National Academies Press; 2003.

with poor work environments.<sup>40</sup> When hospital work environments are poor, evidence suggests that improving staffing alone will be insufficient to improve outcomes for patients.<sup>41</sup>

One way of distinguishing hospitals with the best work environments is to identify Magnet hospitals. The Magnet hospital concept, which became formalized as a voluntary accreditation program in the 1990s through the American Nurses Credentialing Center (ANCC) Magnet Recognition Program, originally evolved from the observation that hospitals that were successful in attracting and retaining qualified nurses resembled the most highly ranked U.S. corporations.<sup>42</sup> Hospitals with these characteristics were identified as being good places for nurses to work,<sup>43</sup> and have also been shown to have better outcomes for patients.<sup>44</sup> A study of hospitals in Pennsylvania showed that mortality rates improved more over time for hospitals that became Magnet hospitals compared with those that did not.<sup>45</sup>

### *Prevention Programs*

Prevention programs also aid in reducing adverse events. For example, the Hospital and Healthsystem Association of Pennsylvania (HAP), its Pennsylvania Hospital Engagement Network (PA-HEN), and its member hospital and health systems, worked throughout 2014 to make infrastructure changes necessary to avoid preventable errors.

Their efforts, which included multiple programs targeting specific adverse events, may have aided in the avoidance of harm events. HAP's report suggests that PA-HEN's prevention programs, launched in 2012, resulted in the following.<sup>46</sup>

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<sup>40</sup>Chenjuan Ma, et al., "Organization of hospital nursing and 30-day readmissions in Medicare patients undergoing surgery," *Med. Care.* 2015; 53(1):65-70; J Brooks Carthon, et al., "The quality of hospital work environments and missed nursing care is linked to heart failure readmissions: a cross-sectional study of US hospitals," *BMJ Quality & Safety.* February 11, 2015 2015; Ann Kutney-Lee, et al., "Nursing: a key to patient satisfaction," *Health Aff (Millwood).* Jun 12 2009;28(4):w669-w677; Linda Aiken, et al., "Effects of nurse staffing and nurse education on patient deaths in hospitals with different nurse work environments," *Med. Care.* 2011;49(12):1047-1053; Ann Kutney-Lee, et al., "Changes in patient and nurse outcomes associated with Magnet hospital recognition," *Med. Care.* 2015; Denna Kelly, et al., "The critical care work environment and nurse-reported health care-associated infections," *American Journal of Critical Care.* 2013;22(6):482-488; Christopher Friese, et al., "Hospital nurse practice environments and outcomes for surgical oncology patients," *Health Serv. Res.* 2008;43(4):1145-1163; Linda Aiken, et al., "Importance of work environments on hospital outcomes in nine countries," *Int. J. Qual. Health Care.* May 11 2011; Linda Aiken, et al., "Effects of hospital care environment on patient mortality and nurse outcomes," *J. Nurs. Adm.* May 2008;38(5):223-229.

<sup>41</sup>Linda Aiken, et al., "Effects of nurse staffing and nurse education on patient deaths in hospitals with different nurse work environments," *Med. Care.* 2011;49(12):1047-1053.

<sup>42</sup>Margaret McClure, et al., "Magnet Hospitals. Attraction and Retention of Professional Nurses," Kansas City, MO: American Nurses Association, American Academy of Nursing. Task Force on Nursing Practice in Hospitals; 1983 1983.

<sup>43</sup>Lesly Kelly, et al., "Nurse outcomes in Magnet® and non-Magnet® hospitals," *J. Nurs. Adm.* 2011;41(10):428-433.

<sup>44</sup>Linda Aiken, et al., "Lower Medicare mortality among a set of hospitals known for good nursing care," *Med. Care.* Aug 1994;32(8):771-787; Matthew McHugh, et al., "Lower mortality in Magnet hospitals," *Med. Care.* 2013;51(5):382-388.

<sup>45</sup>Ann Kutney-Lee, et al., "Changes in patient and nurse outcomes associated with Magnet hospital recognition," *Med. Care.* 2015.

<sup>46</sup>The Hospital & Healthsystem Association of Pennsylvania, "Pennsylvania Hospital Quality: Achieving More Together- 2014 Highlights," 2015.

- Avoidance of 218 central line-associated bloodstream infection harm events and an estimated cost avoidance of \$3.7 million.
- Avoidance of 318 surgical site infection harm events and an estimated cost avoidance of \$6.7 million.
- Avoidance of 63 adverse drug harm events and an estimated cost avoidance of \$300,000.
- Avoidance of 40 obstetrical harm events and an estimated cost avoidance of \$60,000.
- Avoidance of 294 fall harm events and an estimated cost avoidance of \$2 million.
- Avoidance of 33 surgical site infection harm events and an estimated cost avoidance of nearly \$600,000.
- Avoidance of 63,000 readmission and an estimated cost avoidance of \$600 million.

### Causality

Although there is a large and consistent body of evidence demonstrating a relationship between higher levels of nurse staffing and better outcomes for patients (findings that are more robust compared to alternative measures and samples), a frequent criticism of this research is that much of it is cross-sectional—a snapshot in time that cannot determine whether changes in nurse staffing directly lead to improvements for patients. There are, however, a number of studies that clearly signal that the relationship between staffing and outcomes is causal. Needleman and colleagues, for example, carried out an investigation using very detailed nurse staffing data at the unit level and across shifts in a large academic medical center. They found that patients had significantly higher risk of death when they were exposed to more shifts where staffing fell below targeted levels. This study suggests that, even in a single institution (and one that had very good staffing on average), intermittent dips in staffing levels had a significant impact on outcomes for patients.<sup>47</sup> Therefore, even the best hospitals have to remain vigilant to ensure that their staffing is sufficient generally, but also on a consistent basis.

Further bolstering the case that the relationship of nurse staffing to outcomes is a causal one, research from other countries shows that the relationships are consistent across a variety of types of health systems. The largest multinational study on nursing and outcomes, involving nine European Union countries, uncovered remarkably similar results to those found in the United States. Each additional patient in the average nurse’s workload was associated with a 7 percent increase in a patient’s likelihood of death within 30 days.<sup>48</sup> Studies in England,<sup>49</sup> Sweden,<sup>50</sup>

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<sup>47</sup> Jack Needleman, et al., “Nurse staffing and inpatient hospital mortality,” *N. Engl. J. Med.* 2011;364(11):1037-1045.

<sup>48</sup> Linda Aiken, et al., "Articles: Nurse staffing and education and hospital mortality in nine European countries: a retrospective observational study." *The Lancet* 383, (May 24, 2014): 1824-1830.

<sup>49</sup> Ann Marie Rafferty. Et al., “Outcomes of variation in hospital nurse staffing in English hospitals: cross-sectional analysis of survey data and discharge records,” *Int. J. Nurs. Stud.* Feb 2007;44(2):175-182.

<sup>50</sup> Smeds Alenius L, et al., “Staffing and resource adequacy strongly related to RNs’ assessment of patient safety: a national study of RNs working in acute-care hospitals in Sweden,” *BMJ quality & safety.* 2013;bmjqs-2012-001734.

Korea,<sup>51</sup> and China<sup>52</sup> show similar results. Researchers also found a significant relationship between nurse staffing and patient satisfaction in a 12-country study.<sup>53</sup>

## Nurse Reports

Anecdotally, nurses' roles have been vastly expanded over the years. Many nurses have cited that they have had to take over responsibilities such as maintenance and clerical work to keep up with loss of support staff. These extra jobs are taking professional bedside nurses away from the bedside, often leaving them with inadequate time to complete their job in a safe and effective manner. The following stories were shared with JSGC on a confidential basis.

### *First Account*

In October, 2013, I was the charge and facilitating nurse in an intensive care step down unit of a Magnet institution in Pennsylvania. Typically, charge nurses should not take patient assignments because we need to be free to facilitate admissions and discharges from the unit, make decisions, answer phone calls and help other nurses who are experiencing several critical incidents simultaneously. Our patient to nurse ratio is supposed to be a maximum of 3:1.

At 3:00 PM, however, I determined that I needed to pick up an assignment because we had a low census and nursing administration had reduced our staffing to go along with it. Furthermore, the supervisors informed me that they were unable to give me an extra nurse. I reasoned that if I did not take a patient assignment, our unit could get only one admission before our skeleton staff would need to start taking four patients apiece. As a charge nurse, I could not in good conscience do that to my staff.

As is typical, we steadily started getting admissions that evening. One nurse, who had two patients, transferred one out – a time-consuming process in and of itself. She was then left with one patient so I gave her an admission. Then we were informed that we would be getting two more admissions. Both of these patients were on ventilators and required close nursing vigilance and considerable complex care. As a charge nurse, I wanted to give a different nurse one of those patients, but she was already very busy with another patient on a ventilator, so I decided to take this patient myself. This added a fourth patient – a patient on a ventilator no less – to my assignment that already stood at three patients. Bear in mind that in addition to an overwhelmingly challenging – and unsafe – assignment, I was also the charge nurse. I reasoned, though, that this was the best scenario because of the nature of my co-workers' assignments. Clearly, this whole fiasco was unsafe.

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<sup>51</sup> Yunmi Kim, et al., "Effects of hospital nurse staffing on in-hospital mortality, pneumonia, sepsis, and urinary tract infection in surgical patients," *Journal of Korean Academy of Nursing*. 2012;42(5):719-729.

<sup>52</sup> Zhu Xw, You Lm, Zheng J, et al., "Nurse staffing levels make a difference on patient outcomes: a multisite study in Chinese hospitals," *Journal of Nursing Scholarship*. 2012;44(3):266-273.

<sup>53</sup> Linda Aiken, et al., "Patient safety, satisfaction, and quality of hospital care: cross-sectional surveys of nurses and patients in 12 countries in Europe and the United States," *British Medical Journal*. 2012;344:e1717.

In a 2002 study of Pennsylvania hospitals, Aiken, Clarke, Sloane, Sochalski and Silber found that each additional patient per nurse was associated with a 7 percent increase in the likelihood that a patient would die within 30 days of admission and a 7 percent increase in the odds that a nurse would fail to rescue a patient from a downward spiral. In this study, patient characteristics and size, teaching status, and use of technology were taken into account during statistical analysis. Of note, Aiken et al. also found that nurses in those hospitals were more likely to experience burnout and job dissatisfaction.<sup>54</sup>

Bearing this study in mind, when I am put in a situation like the one I have described, I recognize that there is no easy solution. Inevitably, I experience a quandary as I give every ounce of my energy to keeping our patients as safe as I possibly can. Clearly, though, I need a law on my side that will protect my patients, my fellow nurses and myself from disastrous outcomes.

### *Second Account*

I work in the post-partum (maternity) unit of a Magnet institution in Pennsylvania where the recommended patient to nurse ratio is three to four couplets per nurse. During the summer of 2013, our nurses were often assigned to care for five and sometimes six couplets. That is 10 to 12 patients.

When this happens, the mothers and infants do not receive the time and education needed to have successful breastfeeding results. When we don't achieve successful breastfeeding results, infants have a higher rate of complications such as increased bilirubin, dehydration, etc. These issues cause readmissions.

Breastfeeding education is very time consuming, especially with first time mothers. I know personally that I have had to cut patient education time short in order to best divide my time in order to meet the needs of all of my patients. To add insult to injury, when nurses do take the time needed for each patient and subsequently punch out late, they are reprimanded for that.

My place of employment is trying to achieve the Baby Friendly status. This is an initiative launched by UNICEF and the World Health Organization to ensure that all maternity units become centers of breastfeeding support. Regrettably, I feel our mothers and infants are not receiving the time needed for proper education because of our inadequate staffing. There are other issues on my unit because of high nurse-patient ratio, but this one is really a concern to me.

### *Third Account*

I have been a Registered Nurse for over four years. I work in an Intensive Care Unit at a local trauma hospital. You can only imagine the amount and condition of patients we care for daily. Achieving safe staffing is a passion of mine because I was born to care for and help people. I can only do this if there are enough staff members in my unit, allowing me the required time a person needs to be cared for. I am sure you have already either seen or read the statistics that safe staffing causes a 4 to 12 percent decrease in pneumonia rates in surgical patients and that unsafe

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<sup>54</sup> Linda Aiken, et al., "Hospital nurse staffing and patient mortality, nurse burnout, and job dissatisfaction," *JAMA*. Oct 23-30 2002;288(16):1987-1993.



staffing will decrease patient recovery after cardiac arrests. I thought I would provide a personal experience that may help you better understand the impact of safe staffing on the patients I care for.

During Christmas one year, the ICU was full with 12 very sick patients. There were 6 nurses assigned that day, two patients per one nurse. The inevitable happened; one of the patients went into cardiac arrest. We coded the patient for 30 minutes and were able to recover her. The doctor's decided to provide a hypothermia protocol, which consists of cooling the body for 24 hours to prevent any muscle wasting that occurred during the arrest from hurting the brain. This doctor's order made the nurse-to-patient ratio 1:1 for the hypothermia protocol. This meant that there was now a patient that needed one nurse to solely care for her. We called our manager in to work to care for the second patient. However, the manager stated that according to the staffing chart, we had enough staff to care for the patients without him. This second patient had no nurse to adequately care for him. He needed constant suctioning to prevent him from developing life threatening complications. This second patient needed blood transfused because he was actively bleeding; there was no nurse available to secure and transfuse the blood in a timely manner. There was no nurse available to perform these duties because of the changing needs of our assigned patients. Because of the holiday weekend, union representatives and extra staffing were unavailable. The patient passed away a few days later.

Imagine if this second patient was your father, or your husband or brother. If there was an extra nurse there that day, such as a charge nurse, would he have survived? He would have received the suctioning he required, and he would have received the blood transfusions that he needed in a timely manner. Would you have accepted that because a chart said there was enough staff there to provide adequate care for him?

With the legislation being proposed by PSNA, a staffing committee would be in place; they would have looked at the patient conditions in the ICU, and would have required another nurse to work that day, and care for this patient. Perhaps, this patient's final outcome would not have changed, but one cannot help but think that an extra nurse could have made a difference. The story I provided is about a stranger, but he was someone's father, brother, or husband. We need to prevent it from occurring again, hopefully without our immediate families affected.

### **Policy Evidence**

Federal regulation currently states that hospitals must have adequate numbers of licensed registered nurses, licensed practical (vocational) nurses, and other personnel to provide nursing care to all patients as needed. There must be supervisory and staff personnel for each department or nursing unit to ensure, when needed, the immediate availability of a registered nurse for bedside care of any patient.<sup>55</sup> However, due to this vague language, fourteen states have passed their own staffing laws to ensure that staffing is appropriate to ensure the safety of their patients. The states with existing laws listed in Table 1.

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<sup>55</sup> 42 C.F.R. 482.23(b)

State staffing laws typically fall into three general categories: mandated staffing committees, which create staffing plans that reflect the needs of the patient population and match the skills and experience of the staff; mandated specific nurse-to-patient ratios in statutes or regulation, and requiring facilities to disclose staffing levels to the public and/or a regulatory body.

There are seven states that require hospitals to have staffing committees responsible for staffing policy. California is currently the only state that has minimum nurse-to-patient ratios across all units written into law. However, Massachusetts has a law specific to intensive care units, requiring a 1:1 or 1:2 nurse-to-patient ratio, depending on the stability of the patient. Five states require some form of disclosure and/ or public reporting of staffing.<sup>56</sup>

<b>Table 1</b>	
<i>State Staffing Laws</i>	
<b>Type of Regulation</b>	<b>States</b>
Staffing committees	Connecticut, Illinois, Nevada, Ohio, Oregon, Texas, Washington
Nurse-to-patient ratios	California, Massachusetts*
Disclosure and/or public reporting	Illinois, New Jersey, New York, Rhode Island, Vermont
*Only pertains to ICU Source: “Nurse Staffing Plans and Ratios,” American Nurses Association, December 2014. <a href="http://www.nursingworld.org/MainMenuCategories/Policy-Advocacy/State/Legislative-Agenda-Reports/State-StaffingPlansRatios?css=print">http://www.nursingworld.org/MainMenuCategories/Policy-Advocacy/State/Legislative-Agenda-Reports/State-StaffingPlansRatios?css=print</a>	

### *Nurse-to-Patient Ratios*

California’s law, which was passed in 1999 and implemented in 2004, has resulted in improvements in multiple areas. For example, California has seen large improvements in nurse staffing. Figure 1 shows the increase in staffing (measured as RN hours per patient day) compared to a sample of hospitals from other states that were matched based on hospital characteristics. The investigators found a clear effect of implementing the staffing mandate that resulted in nearly one additional hour of nursing time per patient day compared to similar hospitals in other states.

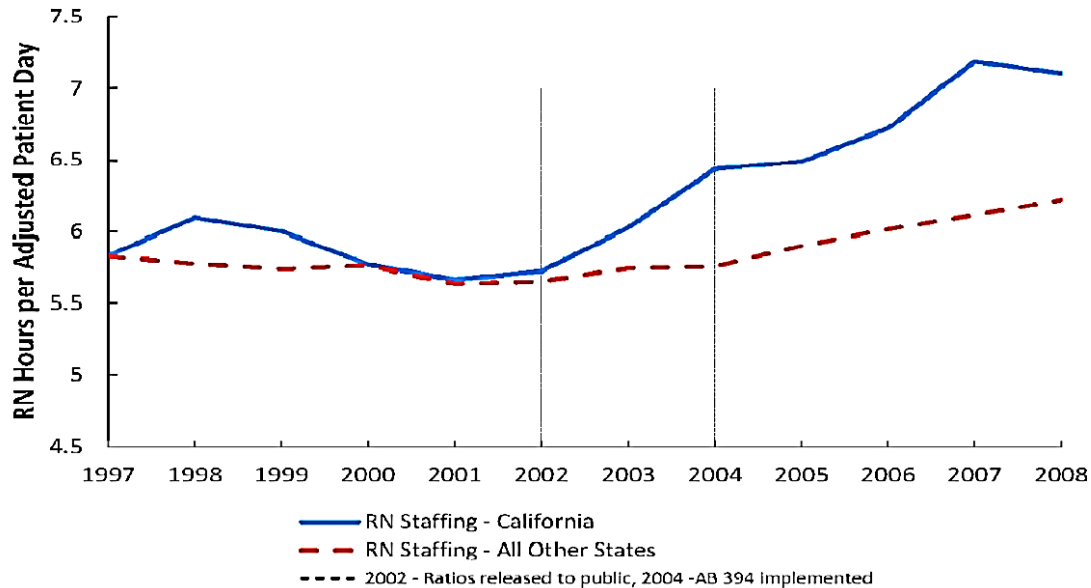
Researchers also found that skill mix did not deteriorate; that is, hospitals did not begin filling positions with an increasing proportion of licensed practical nurses (called licensed vocational nurses in California), who are less skilled and have a more limited scope of practice. This was a concern in response to the California law which allowed hospitals to be considered in compliance with the mandate if up to 50 percent of their required nursing staff was licensed vocational nurses. Some experts were concerned that hospitals would use this provision to increasingly hire more licensed vocational nurses to meet the mandate, eroding the overall skill level of the workforce and undermining the patient safety goals. It turns out that California hospitals followed the same trend of improving skill mix as other hospitals nationally.<sup>57</sup>

<sup>56</sup> “Nurse Staffing Plans and Ratios,” *American Nurses Association*, December 2014. <http://www.nursingworld.org/MainMenuCategories/Policy-Advocacy/State/Legislative-Agenda-Reports/State-StaffingPlansRatios?css=print>

<sup>57</sup> Matthew McHugh, et al., “Contradicting fears, California’s nurse-to-patient mandate did not reduce the skill level of the nursing workforce in hospitals,” *Health Aff (Millwood)*. July 2011;30(7):1299-1306.

**Figure 1**

*Staffing in California Hospitals compared to  
matched set of Hospitals in other states  
1997-2008*



Source: Adapted from McHugh, M. D., Kelly, L., Sloane, D.M., & Aiken, L. H. (2011). Contradicting fears, California's nurse-to-patient mandate did not reduce the skill level of the nursing workforce in hospitals. *Health Affairs*, 30(7), 1299-1306

Overall, evidence regarding the effect of the policy on patient outcomes was largely positive, with no studies showing that patient outcomes were worse in California. For example, Aiken and colleagues evaluated the relationship between staffing and outcomes in California compared to Pennsylvania and New Jersey. They found that in 2006, after implementation of the California law, California nurses cared for, on average, one less patient than nurses in Pennsylvania and New Jersey. They also found that, when staffing was consistent with the California ratios, nurses reported lower levels of burnout and job dissatisfaction. Based on these findings, they estimated that if the average nurse-to-patient ratios in Pennsylvania and New Jersey hospitals had been equivalent to the average ratio across the California hospitals, there would have been 11 percent fewer deaths following surgery in Pennsylvania.

Furthermore, another study that examined staffing and outcomes for California hospitals and patients compared to other states, before and after implementation of the California law, found that staffing increased significantly. The study revealed that there was a significant decrease in FTRs and infections due to medical care. However, improvements in respiratory infections and post-surgical infections were not significantly different between California hospitals and others. One limitation that the authors (and others) note is the inability to account for other important elements such as the nurse work environment. This is important since evidence suggests that benefits of nurse staffing are contingent on good work environments, such as incorporating nurses into decision making at all levels, promoting nurse autonomy, and fostering good working

relationships between nurses and physicians.<sup>58</sup> Likewise, evidence suggests that improving the overall education level of nurses in hospitals leads to better patient outcomes.<sup>59</sup> Therefore, as mentioned, it may be necessary to not just improve staffing to achieve the best patient outcomes, but also ensure the highest education level of the nurse workforce and a good work environment for them to practice in.

The Pennsylvania Association of Staff Nurses and Allied Professionals supports the implementation of minimum nurse-to-patient ratios in Pennsylvania, similar to those in California. 2015 Senate Bill No. 553 has been introduced to the Senate, addressing this in Pennsylvania. This bill is summarized on page 53.

### *Public Reporting of Staffing*

Public reporting of nurse staffing is another approach to improve patient safety. There are three mechanisms through which public reporting laws can improve safety. These policies can motivate hospitals to increase staffing as they become more aware of their standing in terms of staffing compared to market competitors. The publicly reported data could also improve outcomes through the process of encouraging patients to select better-staffed providers by informing their choices. Finally, if more discerning nurses who provide higher quality care use the information to select places to work, outcomes may improve in the places deemed by nurses to be better places to work. There have been no evaluations of the consequences of these policies on patient outcomes.

### *Staffing Committees*

The third approach is the implementation of staffing committees that develop institutional plans to guide staffing decisions. The American Nurses Association and the Pennsylvania State Nurses Association support this approach. Staffing committees are unique to specific mandated ratios because they allow nurses to voice their professional opinions based on the individual needs of the hospital and its units. 2015 House Bill No. 476 has been introduced to the Pennsylvania House of Representatives that would introduce a variant of this policy. This bill is summarized on page 51.

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<sup>58</sup> Linda Aiken, et al., “Effects of nurse staffing and nurse education on patient deaths in hospitals with different nurse work environments,” *Med. Care.* 2011;49(12):1047-1053.

<sup>59</sup> Ann Kutney-Lee, et al., “Changes in patient and nurse outcomes associated with Magnet hospital recognition,” *Med. Care.* 2015.

# DEMOGRAPHICS AND EDUCATION

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## Demographics

Every two years registered nurses (RNs) and licensed practical nurses (LPNs) in Pennsylvania must renew their licenses through the Department of State, Bureau of Professional and Occupational Affairs (BPOA). In cooperation with BPOA, the Department of Health, Bureau of Health Planning surveys RNs and LPNs who are renewing their licenses.

The most recent RN survey, from 2012/2013, received 186,917 valid survey responses from the 205,040 license renewals, a 91.2 percent response rate. This renewal period saw a 5 percent increase in RN license renewals. Of the respondents, 141,554 (76 percent) were employed in Pennsylvania. The following data reflect those who were employed in Pennsylvania at the time of the survey.<sup>60</sup>

For LPNs, the 2012 renewal period saw a renewal rate of 88 percent, or 52,159 renewals. This was a 3 percent increase in the number of LPNs who renewed their licenses compared to 2008. Of the 50,073 valid survey responses that were returned, 36,532 (73 percent) were employed in Pennsylvania and worked as LNs. The following data reflects this population.<sup>61</sup>

## Employment

### *Registered Nurses*

Employment status is defined as being employed in nursing or in a position that requires a nursing license. RNs employed full-time in Pennsylvania accounted for 76 percent of respondents. For nurses working in a hospital setting, 79 percent worked full-time. Those working part-time in a hospital setting accounted for 15 percent, while the remaining 6 percent were employed per diem. Additionally, 56 percent of respondents indicated that a hospital was their primary job setting. Figure 2 represents employment status according to age for all respondents employed in Pennsylvania.

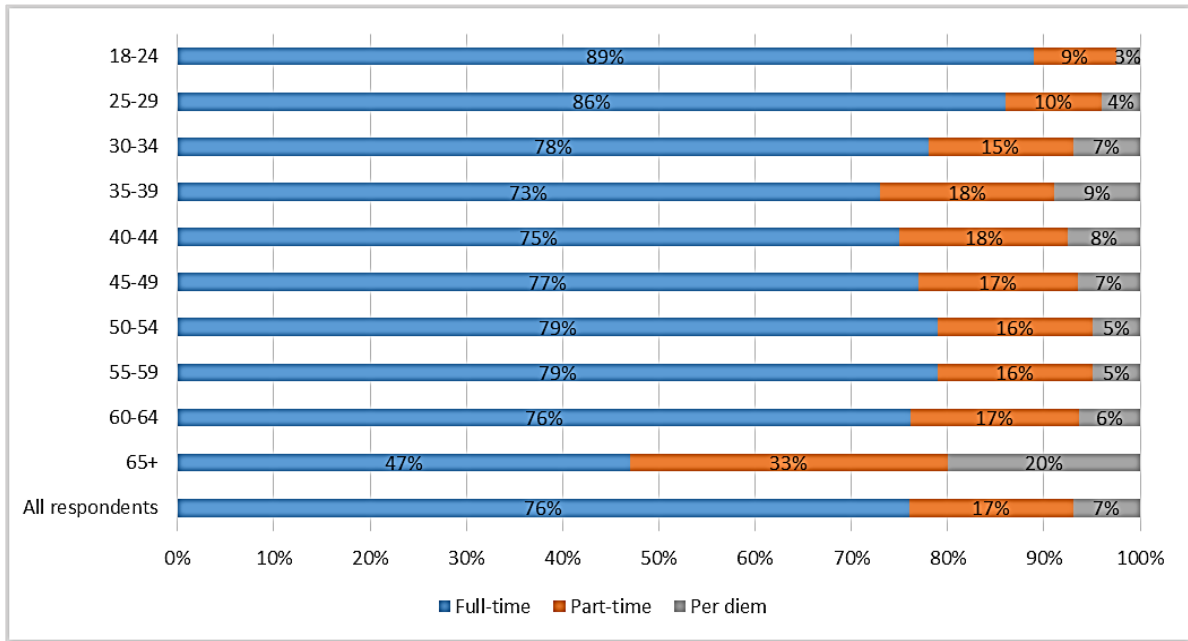
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<sup>60</sup> “2012/2013 Pulse of Pennsylvania’s Registered Nurse Workforce,” March 2015, Pennsylvania Department of Health.

<sup>61</sup> “2012 Pulse of Pennsylvania’s Licensed Practical Nurse Workforce,” March 2013, Pennsylvania Department of Health.

**Figure 2**

*Respondents Employed in Nursing in Pennsylvania  
by Employment Status and Age Groups,  
2012-2013 RN Survey*



In addition, 13 percent (18,538) of respondents worked more than one RN job. Those aged 40 to 44 were more likely to hold multiple RN jobs than other age groups. RNs who were 18 to 24 were the least likely to hold more than one RN job, with those aged 65 or older following closely behind. Males were slightly more likely than females to hold more than one RN job. Unsurprisingly, those who were working part-time or per diem were more likely to hold more than one job than those working full-time. However, 12 percent of respondents employed full-time held more than one RN job. The hospital setting was the most reported secondary job setting, accounting for 37 percent.

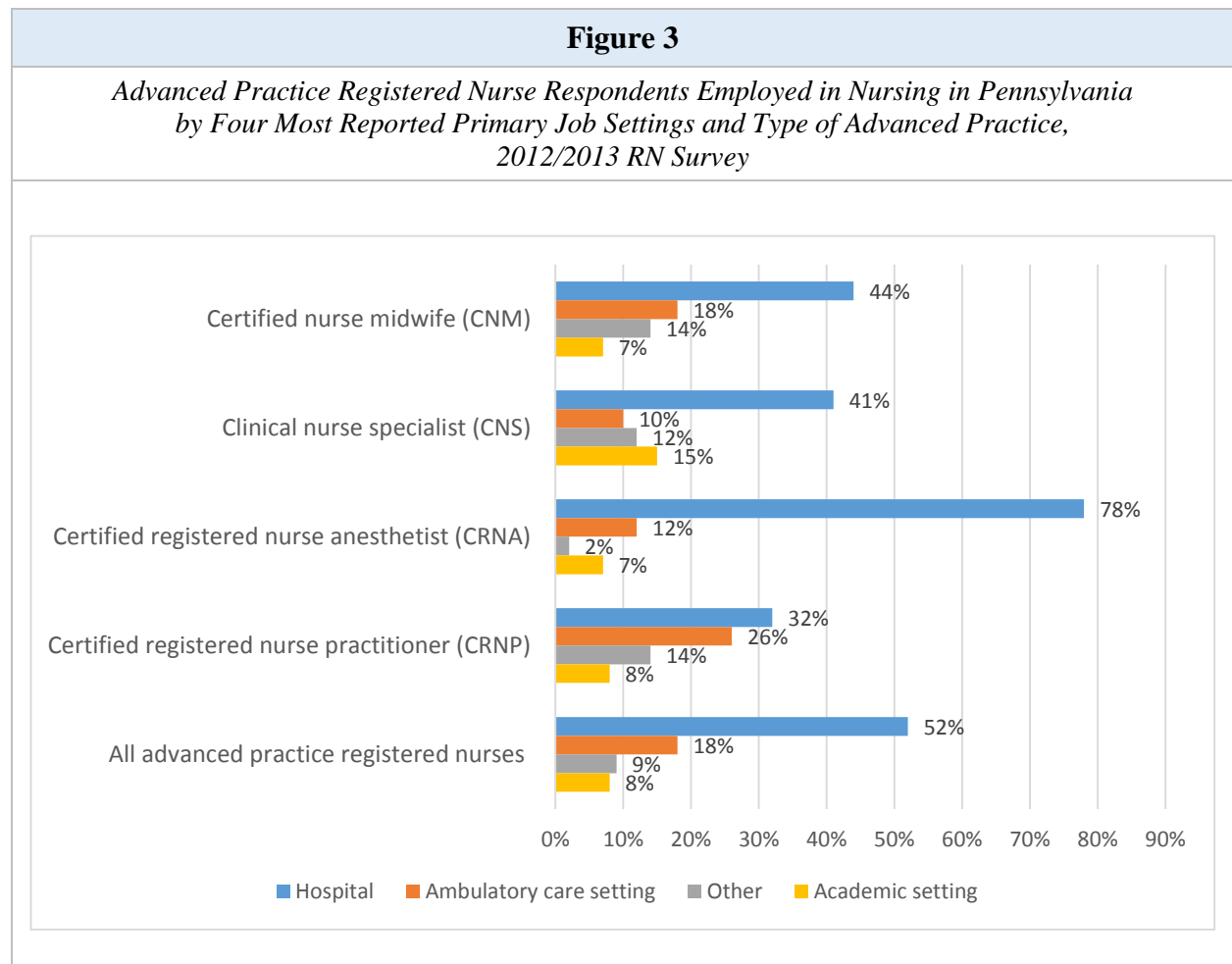
### *Licensed Practical Nurses*

LPNs employed full-time in Pennsylvania accounted for 74 percent of respondents. Seventy-nine percent of LPNs working in a hospital setting worked full-time. Those working part-time in a hospital setting accounted for 16 percent, while the remaining 5 percent were employed per diem. Eleven percent of all LPNs in Pennsylvania were employed in a hospital setting as their primary position, 79 percent of which worked full-time.

Eleven percent of LNPs held more than one nursing position. This was slightly more common for LNPs working in urban counties as opposed to rural counties. Ten percent of full-time LNPs held more than one position, though part-time and per diem nurses were more likely to hold multiple nursing positions. Of those who were employed in more than one nursing position, 72 percent worked their secondary job in an urban county. This was a greater percentage than the 64 percent of respondents who worked in an urban county for their primary job.

*Advanced Practice Nurses*

As was the case with RN respondents employed in nursing in Pennsylvania, over half of all advanced practice registered nurse respondents held their primary job in a hospital setting. Certified registered nurse anesthetists (CRNA) had the highest percentage (78 percent) of respondents employed in a hospital setting.



## Education

### *Registered Nurses*

To become an RN there are three educational options: earning a Bachelor of Science degree in nursing (BSN), earning an associate's degree in nursing (ADN), or completing a diploma program. BSN programs are four-year programs at accredited universities and colleges, while ADN programs are two-year degree programs. Diploma programs are approximately two-year programs at Joint Commission accredited hospitals. Furthermore, Vocational-practical certificates can be earned from nursing programs that are approved by the State Board of Nursing. These certificates are then submitted for application to a more advanced nursing education program (practical nurse, registered nurse).

Though diploma programs were once the primary education for nurses, there is an ongoing shift in initial nursing education away from hospital-based education and towards university and college based education. From 2004/2005 to 2012/2013, those with an associate's degree increased from 31 percent to 33 percent, while respondents with a bachelor's degree increased from 26 percent to 33 percent. Diploma programs fell from 43 percent to 31 percent.

The majority of respondents (71 percent) completed their initial nursing education between the ages of 18 and 29. Nineteen percent indicated that they completed their initial education between the ages of 30 and 39, 8 percent for those between 40 and 49, and less than 2 percent for respondents 50 and older.

<b>Table 2</b>		
<i>Respondents Employed in Nursing in Pennsylvania by Initial Nursing Education, 2012/2013 RN Survey</i>		
<b>Initial Nursing Education</b>	<b>Number</b>	<b>Percent</b>
Associate's degree	46,413	33%
Bachelor's degree	46,404	33
Diploma program	43,170	31
Vocational/Practical Certificate	3,504	2
Master's degree	1,949	1
Doctoral degree	92	< 1
<b>Total</b>	<b>133,857</b>	<b>100</b>

A large portion of nurses in Pennsylvania go on to complete a higher nursing degree beyond their initial education. Accordingly, 23 percent of respondents who first completed a diploma program went on to complete a bachelor's degree or higher nursing education. For those initially completing an associate's degree, 22 percent went on to receive higher nursing education. For vocational/practical certificates, 38 percent went on to complete a higher nursing education.



Importantly, The Institute of Medicine’s report “The Future of Nursing” recommends that by the year 2020, 80 percent of RNs have a bachelor’s degree.<sup>62</sup> Though Pennsylvania’s RN workforce is far from meeting this goal in the next five years, 11,852 of the survey respondents who initially completed a diploma or associate’s degree indicated they were pursuing a nursing bachelor’s degree, the majority of whom expected to graduate in the next four years.

<b>Table 3</b>		
<i>Respondents Employed in Nursing in Pennsylvania by Highest Nursing Education, 2012/2013 RN Survey</i>		
<b>Highest Nursing Education</b>	<b>Number</b>	<b>Percent</b>
Diploma program	32,741	23%
Associate’s degree	40,011	28
Bachelor’s degree	55,217	39
Master’s degree	12,682	9
Doctoral degree	889	1
<b>Total</b>	<b>141,540</b>	<b>100</b>

#### *Licensed Practical Nurses*

In Pennsylvania, LPNs must first complete an approved nursing program. As of October 2011, Pennsylvania had 58 LPN programs in 42 counties, with 3,622 enrolled nursing students. LPN programs consist of community college programs, hospital-based programs, vocational programs, and private licensed programs. Full-time programs are one-year in length and include classroom and clinical components. Following completion of an approved program, individuals must successfully complete a national licensing examination, the National Council Licensure Examination (NCLEX), to become a LPN.

Almost all LPN respondents qualified for their first nursing license with a vocational/practical certificate/diploma. Fifty-eight percent of respondents graduated from their initial nursing education before the age of 30, while 38 percent graduated between the ages of 18 and 24. One percent of LPNs who initially completed a vocational/practical certificate/diploma went on to complete a higher nursing degree.

<b>Table 4</b>		
<i>Respondents Employed in Nursing in Pennsylvania by Initial Nursing Degree, 2012 LPN Survey</i>		
<b>Initial Nursing Education</b>	<b>Number</b>	<b>Percent</b>
Vocational/practical certificate/diploma	35,657	98%
Associate’s degree	809	2
Bachelor’s degree	33	< 1
<b>Total</b>	<b>36,499</b>	<b>100</b>

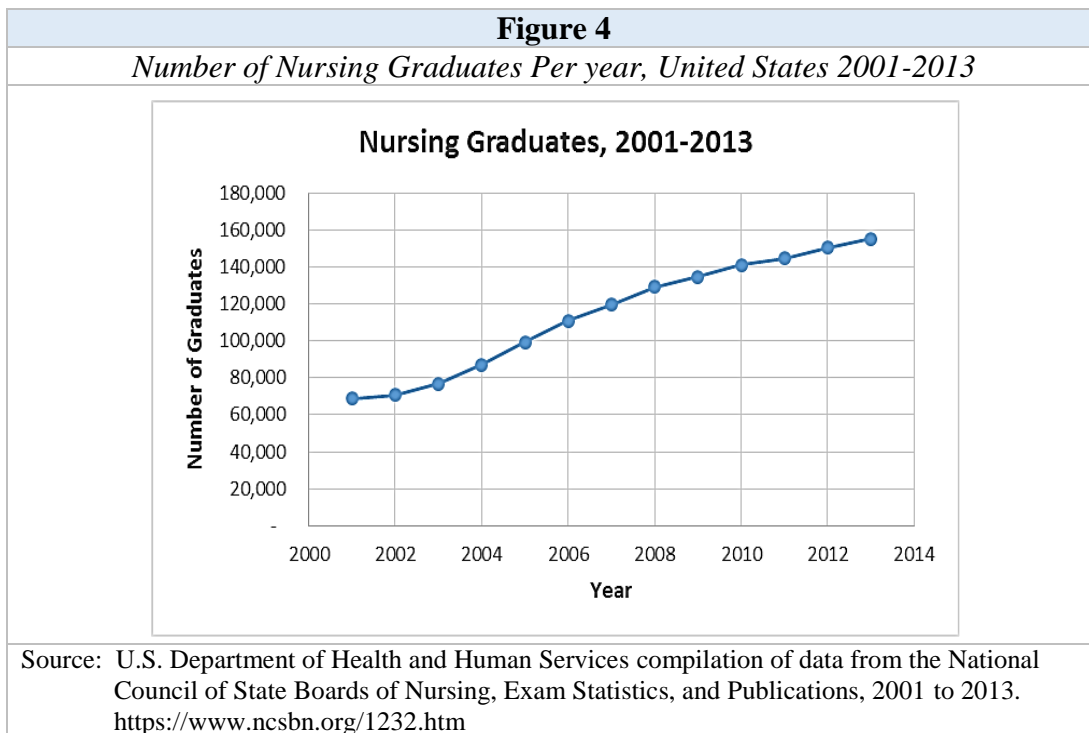
<sup>62</sup> Institute of Medicine, (U.S.), and Foundation Robert Wood Johnson. The Future of Nursing: Leading Change, Advancing Health. Washington, D.C.: National Academies Press, 2011. eBook Collection (EBSCOhost), EBSCOhost (accessed May 22, 2015).

<b>Table 5</b>		
<i>Respondents Employed in Nursing in Pennsylvania by Highest Nursing Degree, 2012 LPN Survey</i>		
<b>Highest Nursing Education</b>	<b>Number</b>	<b>Percent</b>
Vocational/practical certificate/diploma	32,741	23%
Registered nurse diploma	40,011	28
Associate's degree	55,217	39
Bachelor's degree	12,682	9
<b>Total</b>	<b>141,540</b>	<b>100</b>

### Current and Projected National Workforce Data

#### Registered Nurses

Nationally, the number of RNs between 2012 and 2025 is projected to outpace the number of jobs. The number of new graduates entering the workforce has more than doubled since 2001, shown in Figure 4. In 2012, there were 2.9 million active RNs in the workforce. It is projected, however, that by 2025 there will be a 33 percent increase in the RN supply, growing to nearly 3.9 million full-time equivalent (FTE) RNs. These numbers account for an entrance of 2 million new RNs and 1 million RNs leaving the workforce. This projection assumes that new RNs are graduating at the current rate.<sup>63</sup>



<sup>63</sup> U.S. Department of Health and Human Services, Health Resources and Services Administration, National Center for Health Workforce Analysis. The Future of the Nursing Workforce: National- and State-Level Projections, 2012-2025. Rockville, Maryland, 2014.

In spite of this large growth, it is projected that the demand for RNs will only grow by 21 percent to 3.5 million FTE RNs by 2025, resulting in an excess of approximately 340,000 FTE RNs.<sup>64</sup> Importantly, though the U.S. as a whole will see an excess of nurses, 16 states are projected to experience a shortfall. Pennsylvania is not one of these states.

### *Licensed Practical/Vocational Nurses*

The supply of licensed practical/vocational nurses (LPNs) is also set to grow substantially. In 2012, there were approximately 730,000 LPNs active in the workforce; however, that number is expected to grow by 36 percent to 990,900 FTE LPNs by 2025. Despite this growth in supply, demand for FTE LPNs is only expected to grow by 28 percent, to 931,000 by 2025.<sup>65</sup> This will result in an excess of nearly 60,000 FTE LPNs. Furthermore, as in the case of RNs, projections at the national level mask a distributional imbalance at the state level. Twenty-two states are expected to experience smaller growth in supply resulting in a shortage of LPNs. Pennsylvania is expected to be included in these states, with a shortage of 2,310 LPNs.<sup>66</sup>

Importantly, the model is based on traditional roles of RNs and LPNs. Emerging care delivery models will likely contribute to new growth in demand for nurses. Moreover, supply and demand will continue to be affected by a multitude of factors including population growth, the aging population, overall economic conditions, the aging of the nursing workforce, and changes in health care reimbursement. State-level differences in demographics and the labor market will result in considerable variation in the size and adequacy of the nursing workforce across the country.<sup>67</sup>

### *Pennsylvania's Nurse Workforce Projections*

By the year 2025 it is projected that Pennsylvania will have a surplus of 25,800 RNs. However, a shortfall of 2,310 LPNs is to be expected. These projections are based on the current workforce and factor in the increase in utilization of health care services due to expanded insurance coverage under the Affordable Care Act (ACA). However, they do not account for changes in health care delivery.

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<sup>64</sup> The U.S. Bureau of Labor Statistics predicted similar growth in demand; 19.4 percent between 2012 and 2022. U.S. Department of Labor, Bureau of Labor Statistics. (2013, December 19). Occupations with the largest projected number of job openings due to growth and replacement needs, 2012 and projected 2022. Economic News Release Table 8. Retrieved August 19, 2014 from <http://www.bls.gov/news.release/ecopro.t08.htm>.

<sup>65</sup> The U.S. Bureau of Labor Statistic's predicted similar growth in demand; 24.8 percent between 2012 and 2022.

<sup>66</sup> U.S. Department of Health and Human Services, Health Resources and Services Administration, National Center for Health Workforce Analysis. *The Future of the Nursing Workforce: National- and State-Level Projections, 2012-2025*. Rockville, Maryland, 2014.

<sup>67</sup> U.S. Department of Health and Human Services, Health Resources and Services Administration, National Center for Health Workforce Analysis. *The Future of the Nursing Workforce: National- and State-Level Projections, 2012-2025*. Rockville, Maryland, 2014.

<b>Table 6</b>				
<i>Pennsylvania's Nurse Supply and Demand Projections</i>				
<b>Category</b>	<b>2012<sup>a</sup></b>	<b>2025 Projected</b>		
	<b>Supply &amp; Demand</b>	<b>Demand</b>	<b>Supply</b>	<b>Difference</b>
RNs	145,000	152,600	178,400	+25,800
LPN	41,380	44,990	42,680	-2,310

<sup>a</sup>. Projections assume demand and supply are equal in 2012 and nurses remain in their state of training.  
Source: U.S. Department of Health and Human Services, Health Resources and Services Administration, National Center for Health Workforce Analysis. *The Future of the Nursing Workforce: National- and State-Level Projections, 2012-2025*. Rockville, Maryland, 2014.

**Alternative Scenarios**

There are several alternative scenarios to consider, which are laid out in *The Future of the Nursing Workforce* report. For example, if RN demand returns to pre-recession levels (prior to 2007), then excess nurses in 2025 would decline from 340,000 to 236,000. Further, decreasing the number of new graduates to 126,000 to 133,000 per year from the current rate of about 150,000 would align projected supply with projected demand. These scenarios assume that the delivery patterns remain unchanged.

It is important to note that, since the 1980s, the annual number of nurse graduates has been cyclical and characterized by high growth followed by declines of up to 25 percent. In the event that nurses begin retiring two years earlier than pre-recession levels, coupled with a 10 percent drop in graduation rates, future supply would fall below projected demand. This would result in a shortfall of 86,000 RNs in 2025.

Though the evidence points towards an excess in supply, a combination of the above and other factors may change the future nurse workforce supply and demand. Furthermore, though the numbers account for an increase in utilization of health care services due to expanded insurance coverage under the Affordable Care Act (ACA), they do not account for changes in health care delivery. This is due to the uncertainty of the effects ACA will have on staffing patterns and the evolving roles of different health professionals. If the growing emphasis on care coordination, preventive services, and chronic disease management in care delivery models leads to a greater need for nurses, this overview may underestimate the projected nurse demand.<sup>68</sup>

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<sup>68</sup> U.S. Department of Health and Human Services, Health Resources and Services Administration, National Center for Health Workforce Analysis. *The Future of the Nursing Workforce: National- and State-Level Projections, 2012-2025*. Rockville, Maryland, 2014.

## Age

According to the survey results, the average age of respondents employed in nursing was 46.5 years. This is an increase from 45.5 years in 2004/2005. The age range with the most respondents was 55 to 59, accounting for 15 percent of respondents.

<b>Table 7</b>				
<i>Respondents Employed in Nursing in Pennsylvania, by Age Groups, 2012-2013 RN Survey and 2012 LPN Survey</i>				
<b>Age Group</b>	<b>RNs</b>		<b>LPNs</b>	
	<b>Respondents</b>	<b>Percent</b>	<b>Respondents</b>	<b>Percent</b>
18-24	3,587	2%	952	3%
25-29	13,666	10	2,950	8
30-34	13,154	9	3,516	10
35-39	13,276	9	4,527	11
40-44	16,413	12	4,606	12
45-49	17,902	13	5,190	13
50-54	19,841	14	5,190	14
55-59	21,237	15	5,614	15
60-64	14,334	10	3,460	9
65+	8,144	6	1,717	5
<b>Total</b>	<b>141,554</b>	<b>100</b>	<b>36,517</b>	<b>100</b>

## Gender

Females accounted for 92 percent of RN respondents employed in nursing in Pennsylvania. Though females comprise the large majority of the RN workforce, the number of males increased from 5,975 in 2004/2005 to 11,870 in 2012/2013. Forty-one percent of male respondents fell into the 35 to 49 age group, while 40 percent of female respondents fell into the 50 to 64 age group.

Similar to RNs, 93 percent of LPNs in Pennsylvania in 2012 were female. Forty-three percent of male respondents fell into the 35 to 49 age group, while 39 percent of female respondents fell into the 50 to 64 age group.

## Race and Ethnicity

The large majority of RNs and LPNs identified themselves as white. Most numbers were stable from previous surveys, although there was a significant change in the number of RNs who identified themselves as American Indian/Alaska Native, increasing from 77 in 2004/2005 to 586 in 2012/2013. There was also an increase in RNs who reported being of Hispanic/Latino origin, from 1 percent to 2 percent. See Table 8 and Table 9.

<b>Table 8</b>				
<i>Respondents Employed in Nursing in Pennsylvania by Race, 2012/2013 RN Survey and 2012 LPN Survey</i>				
<b>Race</b>	<b>RNs</b>		<b>LPNs</b>	
	<b>Respondents</b>	<b>Percent</b>	<b>Respondents</b>	<b>Percent</b>
White	128,653	91%	30,793	84%
Black	7,296	5	4,592	13
Asian	4,087	3	542	1
Other	594	< 1	338	1
American Indian/ Alaska Native	586	< 1	192	1
Native Hawaiian/ Other Pacific Islander	181	< 1	42	<1
<b>Total</b>	141,397	100	36,499	100

<b>Table 9</b>				
<i>Respondents Employed in Nursing in Pennsylvania, by Ethnicity, 2012/2013 RN Survey and 2012 LPN Survey</i>				
<b>Ethnicity</b>	<b>RNs</b>		<b>LPNs</b>	
	<b>Respondents</b>	<b>Percent</b>	<b>Respondents</b>	<b>Percent</b>
Hispanic/Latino	2,341	2%	792	2%
Non-Hispanic/Latino	138,799	98	35,742	98
<b>Total</b>	141,140	100	36,532	100

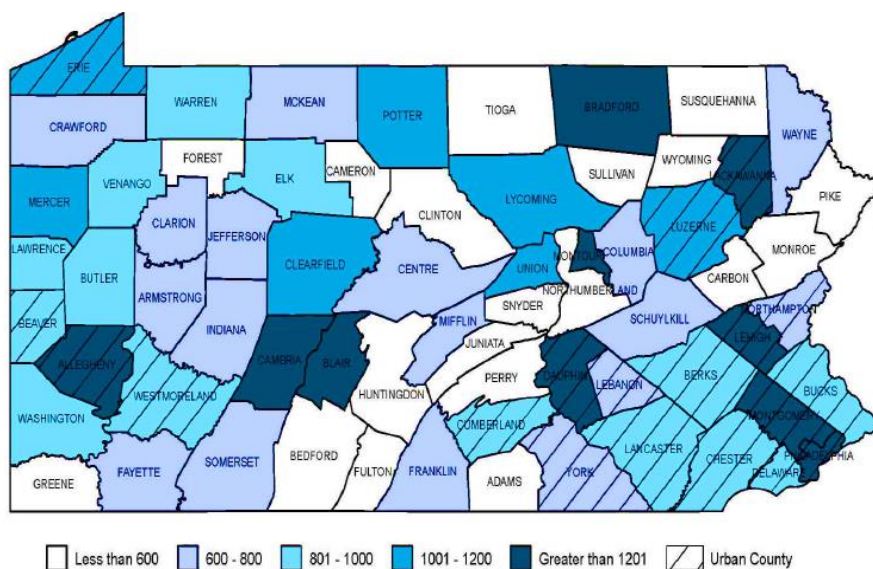
### *Geography*

RN respondents employed in nursing worked in all 67 Pennsylvania counties. Rural counties employed 28,656 (20 percent) RN respondents. The overall ratio of RNs was 1,112 per 100,000 population; however, when dividing the Commonwealth between urban and rural counties, ratios were considerably different. In rural counties the ratio was 826 per 100,000, while the ratio for urban counties was 1,219 per 100,000. Figure 5 illustrates the broad range in RNs employed per 100,000 population. Montour County, which had the highest ratio, employed 9,554 RNs per 100,000, while Pike County, which had the lowest ratio, employed just 140 RNs per 100,000 population.<sup>69</sup> Additionally, nurses employed in rural counties are more likely to plan to leave within the next five years (19 percent) than those working in urban counties (16 percent).

<sup>69</sup> Montour County is home to Geisinger Medical Center, one of the largest health systems in the state.

**Figure 5**

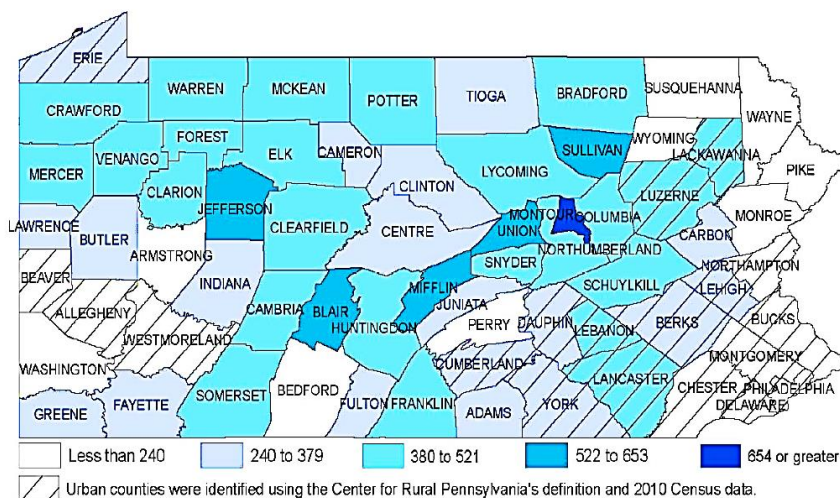
*Respondents Employed in Nursing in Pennsylvania  
per 100,000 Population by County of Primary Job, 2012/2013 RN Survey*



LPNs had an average ratio of 286 per 100,000 population. As of 2012, 36 percent (12,987) of LPN respondents were employed in rural counties. The ratio of LPN respondents employed in nursing in Pennsylvania was 253 per 100,000 population in urban counties, while rural counties had a rate of 374 per 100,000. As was the case with RNs, LPNs per population varied widely. Montour County had the highest ratio at 1,786 per 100,000, whereas Pike County had just 115 LPNs per 100,000 population.

**Figure 6**

*Respondents Employed in Nursing in Pennsylvania  
per 100,000 Population by County of Primary Job, 2012 LPN Survey*







## LENGTH OF SHIFTS

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Traditionally, nurses worked one of three, eight-hour shifts. However, in recent years, 12-hour shifts have become the standard for nurse staffing. In 2006, a survey of nurses from Pennsylvania, California, Florida, and New Jersey showed that the majority of nurses worked 12 to 13 hour shifts, with 4 percent working for more than 13 hours.<sup>70</sup>

Twelve hour shifts are typically popular among nurses because it allows for a shorter work week, schedule flexibility, and a good work-life balance. They are also popular for hospitals because there is less of an administrative burden, particularly for scheduling. In addition, there have been suggestions that 12-hour shifts are beneficial due to more continuity of care. Communication errors often occur at shift changes, putting patients at risk from these errors more often with eight hour shifts.

Conversely, studies have shown that 12-hour shifts can negatively impact patient safety. Working 12-hour shifts and working overtime have been associated with difficulties staying awake while on duty, reduced sleep times, and increasing the risk of error. This is especially worrisome when nurses are working back-to-back shifts of 12 hours or more.<sup>71</sup> Nurses working two or more consecutive 12 hour shifts results in short sleeps, attention lapses on the job, drowsy driving, and decreased neurobehavioral performance.<sup>72</sup>

The evidence that longer shifts are detrimental to patient safety and quality of care has only mounted over the last decade. Studies have shown that HAIs, poor patient experience, and mortality were more likely in hospitals where long shifts were frequent.<sup>73</sup> Nurses working in hospitals where long shifts are common were more likely to report missing important elements of care, medication errors, and were more likely to rate the quality and safety of care in their institution as low.<sup>74</sup>

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<sup>70</sup> Amy Stimpfel, et al., "Hospital staff nurses' shift length associated with safety and quality of care," *Journal of Nursing Care Quality*. 2013;28(2):122-129.

<sup>71</sup> Deborah Dubeck, "Healthcare Worker Fatigue: Current Strategies for Prevention." *Pennsylvania Patient Safety Authority*. 11, No. 2 (2014), 53-59. Accessed July 22, 2014; Ann Rogers, et al., "The working hours of hospital staff nurses and patient safety," *Health Aff.* Jul-Aug 2004;23(4):202-212; Jeanne Geiger-Brown, et al., "Is it time to pull the plug on 12-hour shifts?: Part 1. The evidence," *J. Nurs. Adm.* 2010;40(3):100-102.

<sup>72</sup> Jean Geiger-Brown, et al., "Sleep, sleepiness, fatigue, and performance of 12-hour-shift nurses," *Chronobiol. Int.* 2012;29(2):211-219.

<sup>73</sup> Amy Stimpfel, et al., "The longer the shifts for hospital nurses, the higher the levels of burnout and patient dissatisfaction," *Health Aff.* November 1, 2012 2012;31(11):2501-2509; Amy Stimpfel, et al., "How Differing Shift Lengths Relate to Quality Outcomes in Pediatrics," *J. Nurs. Adm.* 2013;43(2):95-100; DM Olds, et al., "The effect of work hours on adverse events and errors in health care," *Journal of Safety Research*. 2010;41(2):153-162.

<sup>74</sup> Amy Stimpfel, et al., "Hospital staff nurses' shift length associated with safety and quality of care," *Journal of Nursing Care Quality*. 2013;28(2):122-129; DM Olds, et al., "The effect of work hours on adverse events and errors in health care. *Journal of Safety Research*. 2010;41(2):153-162; P Griffiths, et al., "Nurses' Shift Length and Overtime Working in 12 European Countries," *Med. Care*. 2014.

Additionally, shift lengths tend to be unpredictable due to fluctuations in patient needs and unanticipated staffing changes. This often leaves nurses working unplanned overtime on a voluntary basis. Subsequently, nurses may be working well beyond their scheduled shift length. This may be dangerous for patient safety since studies have shown that shifts lasting longer than 12.5 hours most significantly increases the risk of error.<sup>75</sup>

Furthermore, longer work hours not only have the potential to negatively affect patients, nurses themselves may feel the burden. Nurses working in shifts of 10 hours or more were 2.5 times more likely to experience burnout, job dissatisfaction, and intent to leave.<sup>76</sup> Nurses are also more likely to experience a workplace injury, such as lower back injuries and accidental needle sticks, and may endanger others by driving while drowsy.<sup>77</sup>

In 2014, the Pennsylvania Patient Safety Advisory released a report which found that, over the past ten years, 1,601 reported incidents were related to hospital healthcare worker fatigue. Though the large majority of events did not result in any known harm to the patient, 2.3 percent of events were classified as “Serious Events,” which indicate patient injury or death. The most common errors related to worker fatigue were medication errors (62.1 percent) and procedure/treatment/test errors (26.4 percent). The hospital locations where healthcare worker fatigue-related events were most common (medical-surgical units, general medical wards, and emergency departments) were also units with highly variable nurse staffing levels.<sup>78</sup>

## Overtime Requirements

The Prohibition of Excessive Overtime in Health Care Act (Act 102), which set limits on when Pennsylvania hospitals can require a nurse to work overtime, went into effect July 1, 2009. Act 102 prohibits a health care facility from requiring employees to work more than an agreed to, predetermined and regularly scheduled work shift. However, Act 102 provides exceptions in the following circumstances: a declared national, state, or municipal emergency or other catastrophic event; if unexplained staff absences occur that could affect patient safety; or if all other resources have been depleted and additional hours are a last resort.

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<sup>75</sup> Ann Rogers, “The Effects of Fatigue and Sleepiness on Nurse Performance and Patient Safety,” In: Hughes RG, editor. *Patient Safety and Quality: An Evidence-Based Handbook for Nurses*. Rockville (MD): Agency for Healthcare Research and Quality (US); 2008 Apr. Chapter 40.

<sup>76</sup> Amy Stimpfel, et al., “The longer the shifts for hospital nurses, the higher the levels of burnout and patient dissatisfaction,” *Health Aff.* November 1, 2012 2012;31(11):2501-2509.

<sup>77</sup> DM Olds, et al., “The effect of work hours on adverse events and errors in health care,” *Journal of Safety Research*. 2010;41(2):153-162; AM Trinkoff, et al., “Longitudinal relationship of work hours, mandatory overtime, and on-call to musculoskeletal problems in nurses,” *Am. J. Ind. Med.* 2006;49(11):964-971; AM Trinkoff, et al., “Work schedule characteristics and substance use in nurses,” *Am. J. Ind. Med.* 1998;34(3):266-271; AM Trinkoff, et al., “Work schedule, needle use, and needlestick injuries among registered nurses,” *Infection Control*. 2007;28(02):156-164; Claire Caruso, et al., “Overtime and extended work shifts: recent findings on illnesses, injuries, and health behavior,” Vol 143: US Department of Health and Human Services, Centers for Disease Control and Prevention, National Institute for Occupational Safety and Health; 2004; Linda Scott, et al., “The relationship between nurse work schedules, sleep duration, and drowsy driving,” *Sleep*. 2007;30(12):1801.

<sup>78</sup> Deborah Dubeck, “Healthcare Worker Fatigue: Current Strategies for Prevention,” *Pennsylvania Patient Safety Advisory*. 2014 11(2):53-60.

There has been no data collection on nurse overtime since Act 102 went into effect. Accordingly, there is no way to evaluate whether overtime has become less prevalent as a result of the act in Pennsylvania. However, in 2008, prior to the effective date, 6.8 percent of Pennsylvania RNs reported that they typically worked mandatory overtime, while 28.9 percent reported that they typically worked voluntary overtime.<sup>79</sup> By region, overtime varied widely.<sup>80</sup>

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<sup>79</sup> U.S. Department of Health and Human Services, Health Resources and Services Administration, “The Registered Nurse Population: Findings from the 2008 National Sample Survey of Registered Nurses,” September 2010

<sup>80</sup> Center for Health Outcomes and Policy Research at the University of Pennsylvania, “Multi-State Nursing Care and Patient Safety Survey,” 2006.



## LENGTH OF EMPLOYMENT

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Nurse turnover within hospitals can be exceedingly expensive due to costs of new recruiting, hiring, training, and orienting new employees. In addition, turnover often leads to decreased productivity.<sup>81</sup> A report by PricewaterhouseCoopers suggested that each additional percentage point increase in nurse turnover results in an additional \$300,000 in costs annually for the average hospital. For hospitals with low retention rates, this translates into spending \$3.6 million more, on average, than hospitals with high retention rates.<sup>82</sup>

Unfortunately, due to limitations in data on turnover, there are few studies available evaluating the relationship between nurse staffing and turnover directly. Nonetheless, there is strong evidence suggesting a relationship between nurse staffing and key factors that lead to turnover. Nurses working in hospitals with better nurse staffing and a good work environment are less likely to intend to leave their job, be burned out, and be dissatisfied with their job, all of which lead to turnover.<sup>83</sup> Additionally, data over time shows that improvements in the work environment of Pennsylvania hospitals translates into lower rates of burnout among nurses.<sup>84</sup>

Higher emotional exhaustion and greater job dissatisfaction in nurses has been shown to be strongly and significantly associated with nurse-to-patient ratios. One study showed that an increase of one patient per nurse increased burnout by 2 percent and job dissatisfaction by 15 percent. Moreover, 43 percent of nurses who reported high burnout and were dissatisfied with their job intended to leave in the next year, while only 11 percent of those who were not dissatisfied intended to leave.<sup>85</sup>

However, staffing is not the only environmental factor that is important in keeping nurses working within the hospital setting. A common misperception is that wages must increase in order to improve satisfaction and retain workers. In fact, evidence suggests that sufficient staffing and good work environments are more important than wages in preventing burnout, job dissatisfaction,

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<sup>81</sup> J. Deane Waldman, et al., "The shocking cost of turnover in health care," *Health care management review*. 2004;29(1):2-7; MJ Gilmartin, "Thirty Years of Nursing Turnover Research: Looking Back to Move Forward," *Med. Care Res. Rev.* February 1, 2013 2013;70(1):3-28; LJ Hayes LJ, et al., "Nurse Turnover: a literature review - an update," *Int. J. Nurs. Stud.* Jul 2012;49(7):887-905.

<sup>82</sup> "What Works: Healing the Healthcare Staffing Shortage," *PricewaterhouseCoopers*. 2007

<sup>83</sup> Linda Aiken, et al., "Hospital nurse staffing and patient mortality, nurse burnout, and job dissatisfaction," *JAMA*. Oct 23-30 2002;288(16):1987-1993; Linda Aiken, et al., "Effects of hospital care environment on patient mortality and nurse outcomes," *J. Nurs. Adm.* May 2008;38(5):223-229; Lesly Kelly, et al., "Nurse outcomes in Magnet® and non-Magnet® hospitals," *J. Nurs. Adm.* 2011; 41(10):428-433; Matthew McHugh, et al., "Wage, work environment, and staffing: effects on nurse outcomes," *Policy, Politics, & Nursing Practice*. 2014; Published early online.

<sup>84</sup> Ann Kutney-Lee, et al., "Changes in hospital nurse work environments and nurse job outcomes: An analysis of panel data," *Int. J. Nurs. Stud.* 2013;50(2):195-201.

<sup>85</sup> Linda Aiken, et. al., "Hospital Nurse Staffing and Patient Mortality, Nurse Burnout, and Job Dissatisfaction," *American Medical Association* 288, no. 16 (2002), 1987-1993. Accessed July 21, 2014.

and intent to leave.<sup>86</sup> Even after taking staffing into account, researchers have found that hospitals with a good work environment are less likely to intend to leave their job.<sup>87</sup> Research on nurses working in high performing health systems, such as Magnet hospitals and Kaiser Permanente hospitals in California, known for their excellent work environments for nurses, showed that these nurses are less likely to intend to leave the job.<sup>88</sup>

It is important to note that though nurse turnover is a significant outcome, these precursors carry their own risks for patients when hospitals have many burned out and dissatisfied nurses. For example, hospitals with higher proportions of burned out and dissatisfied nurses have also been shown to have higher rates of hospital-acquired infections, lower patient satisfaction, and lower ratings of hospital quality.<sup>89</sup> These problems are particularly pronounced for nurses working directly at the bedside with patients in hospital settings.<sup>90</sup>

## Pennsylvania

### *Job Satisfaction*

According to the 2012/2013 Pulse report, 92 percent of RN respondents employed in nursing in Pennsylvania were satisfied or very satisfied with nursing as a career, leaving 8 percent who were either dissatisfied or very dissatisfied. Those working more than one RN job had higher rates of being very satisfied with their career. However, when looking at job satisfaction in respondent's primary job, as opposed to satisfaction for nursing as a career choice, 88 percent of respondents were satisfied or very satisfied.<sup>91</sup>

For those employed in a hospital setting 92 percent were satisfied or very satisfied with nursing as a career. This leaves 8 percent of respondents working in the hospital setting who were either dissatisfied or very dissatisfied with their nursing career. When asked about their satisfaction in their primary job the number decreased to 87 percent for those who were either satisfied or very satisfied in the hospital setting.<sup>92</sup>

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<sup>86</sup> Matthew McHugh, et al., "Wage, work environment, and staffing: effects on nurse outcomes," *Policy, Politics, & Nursing Practice*. 2014;Published early online.

<sup>87</sup> Ann Kutney-Lee, et al., "Changes in hospital nurse work environments and nurse job outcomes: An analysis of panel data," *Int. J. Nurs. Stud.* 2013;50(2):195-201.

<sup>88</sup> G Duce, et al., "Prevention of hospital acquired infections: a practical guide," Geneva: World Health Organization, 2002; Ann Kutney-Lee, et al., "Changes in patient and nurse outcomes associated with Magnet hospital recognition," *Med. Care*. 2015; Matthew McHugh, et al., "Achieving Kaiser Permanente Quality," *Health Care Management Review*. 2015.

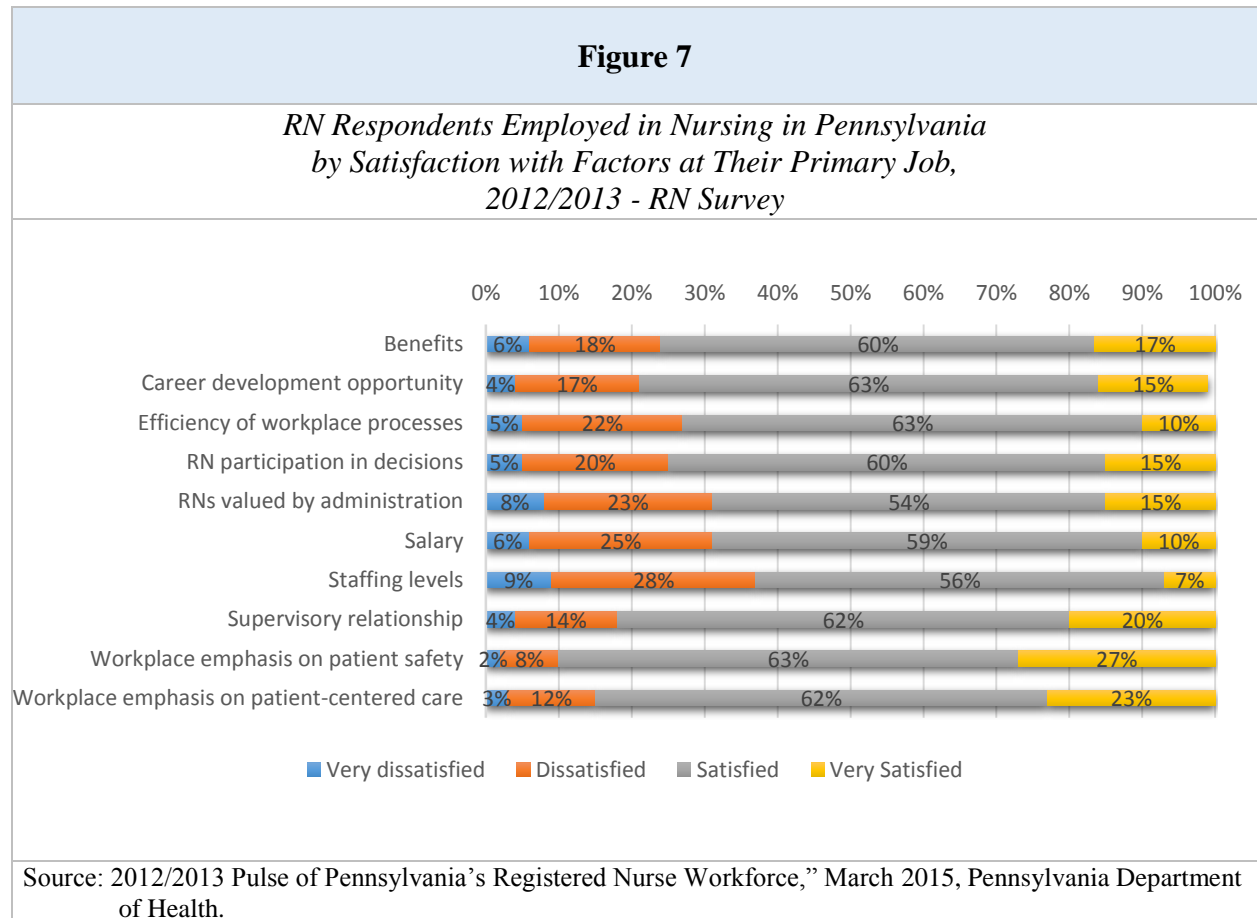
<sup>89</sup> JP Cimiotti, et al., "Nurse staffing, burnout, and health care-associated infection," *Am. J. Infect. Control*. 2012;40(6):486-490; Matthew McHugh, et al., "Nurses' widespread job dissatisfaction, burnout and frustration with health benefits signal problems for patient care," *Health Aff (Millwood)*. February 2011;30(2):202-210; Lusine Poghosyan, et al., "Nurse burnout and quality of care: Cross-national investigation in six countries," *Res. Nurs. Health*. 2010;33(4):288-298; Dors C. Vahey, et al., "Nurse burnout and patient satisfaction," *Med. Care*. Feb 2004;42(2 Suppl):II57-66.

<sup>90</sup> Matthew McHugh, et al., "Nurses' widespread job dissatisfaction, burnout and frustration with health benefits signal problems for patient care," *Health Aff (Millwood)*. February 2011;30(2):202-210;

<sup>91</sup> Pennsylvania Department of Health, 2012/2013 Pulse of Pennsylvania's Registered Nurse Workforce. March 2015

<sup>92</sup> Pennsylvania Department of Health, 2012/2013 Pulse of Pennsylvania's Registered Nurse Workforce. March 2015

Furthermore, different aspects of the job saw different satisfaction rates. When asked about staffing levels, 37 percent of RN respondents indicated that they were either dissatisfied or very dissatisfied. The 2010/2011 survey, which specifically surveyed those who provide direct patient care, indicated that 39 percent were dissatisfied or very dissatisfied. Out of the ten specific factors the survey reported on, staffing had the highest levels of dissatisfaction for both the 2010/2011 and 2012/2013 surveys.



### *Length of Employment*

The large majority of nurses who begin their nursing career in Pennsylvania stay in the Commonwealth. According to the surveys, 86 percent of RNs employed in nursing in Pennsylvania received their first RN license in PA, while 92 percent of LNPs employed in Pennsylvania received their first LPN license in PA.

<b>Table 10</b>		
<i>Respondents Employed in Nursing in Pennsylvania by Number of Years Licensed as an RN, 2012/2013 RN Survey</i>		
<b>Length of Time</b>	<b>Number</b>	<b>Percent</b>
0-4 years	23,781	17%
5-10 years	26,189	19
11-15 years	11,716	8
16-20 years	17,944	13
21+ years	61,826	44
<b>Total</b>	<b>141,456</b>	<b>100</b>
Source: 2012/2013 Pulse of Pennsylvania's Registered Nurse Workforce," March 2015, Pennsylvania Department of Health.		

Nearly half of RN respondents planned on staying in nursing for 16 years or more. Five percent of respondents planned on leaving within the next two years. Length of employment was, unsurprisingly, highly and inversely correlated with age. For hospitals, 29 percent of respondents planned on leaving the workforce within the next ten years and 13 intended to leave their job within the next five years, one in four of which intended to leave for reasons other than retirement and 13 percent intended to leave because of stress or burnout. Table 11 shows the length of time nurses intended to remain in nursing, by age group.

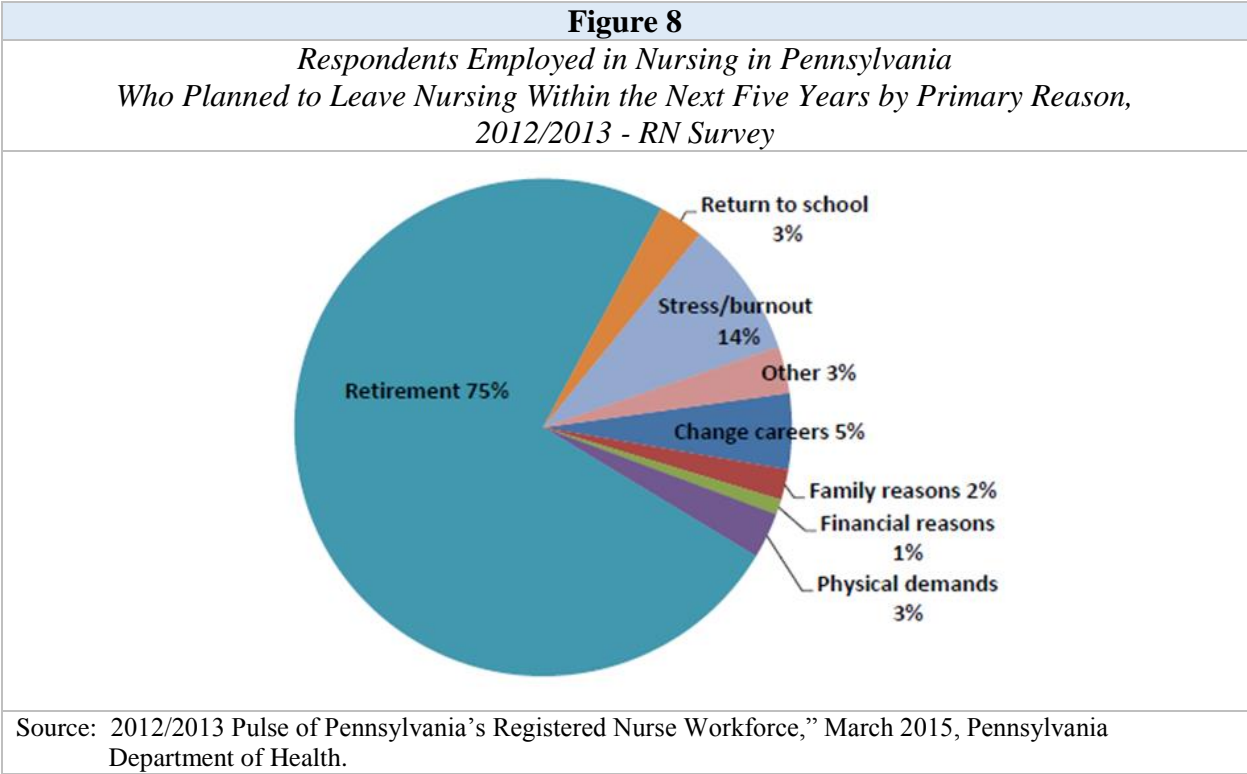


**Table 11**  
*Respondents Employed in Nursing in Pennsylvania  
by the Length of Time They Intended to Remain in Nursing and Age Groups,  
2012/2013 - RN Survey*

Age Groups	0-5 Years		6-10 Years		11-15 Years		16+ Years	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
18-24	176	5%	140	4%	82	2%	3,187	89%
25-29	706	5	620	5	368	3	11,967	88
30-34	589	4	668	5	528	4	11,361	86
35-39	581	4	757	6	933	7	10,997	83
40-44	674	4	1,037	6	2,180	13	12,511	76
45-49	720	4	1,857	10	4,639	26	10,679	60
50-54	1,111	6	4,600	23	9,144	46	4,976	25
55-59	3,737	18	11,161	53	5,288	25	1,039	5
60-64	8,612	60	4,987	35	535	4	177	1
65+	7,005	86	951	12	86	1	80	1
<b>Total</b>	<b>23,911</b>	<b>17</b>	<b>26,778</b>	<b>19</b>	<b>23,783</b>	<b>17</b>	<b>66,974</b>	<b>47</b>

Source: 2012/2013 Pulse of Pennsylvania's Registered Nurse Workforce," March 2015, Pennsylvania Department of Health.

The majority (75 percent) of those who planned on leaving within the next five years cited retirement as the reason. However, there was a significant portion of those who intended to leave who cited stress/burnout (14 percent) or physical demands (3 percent). Stress/burnout was the most reported reason nurses under the age of 50 planned on leaving the field. Figure 8 depicts the primary reason why nurses intend to leave within the next five years.

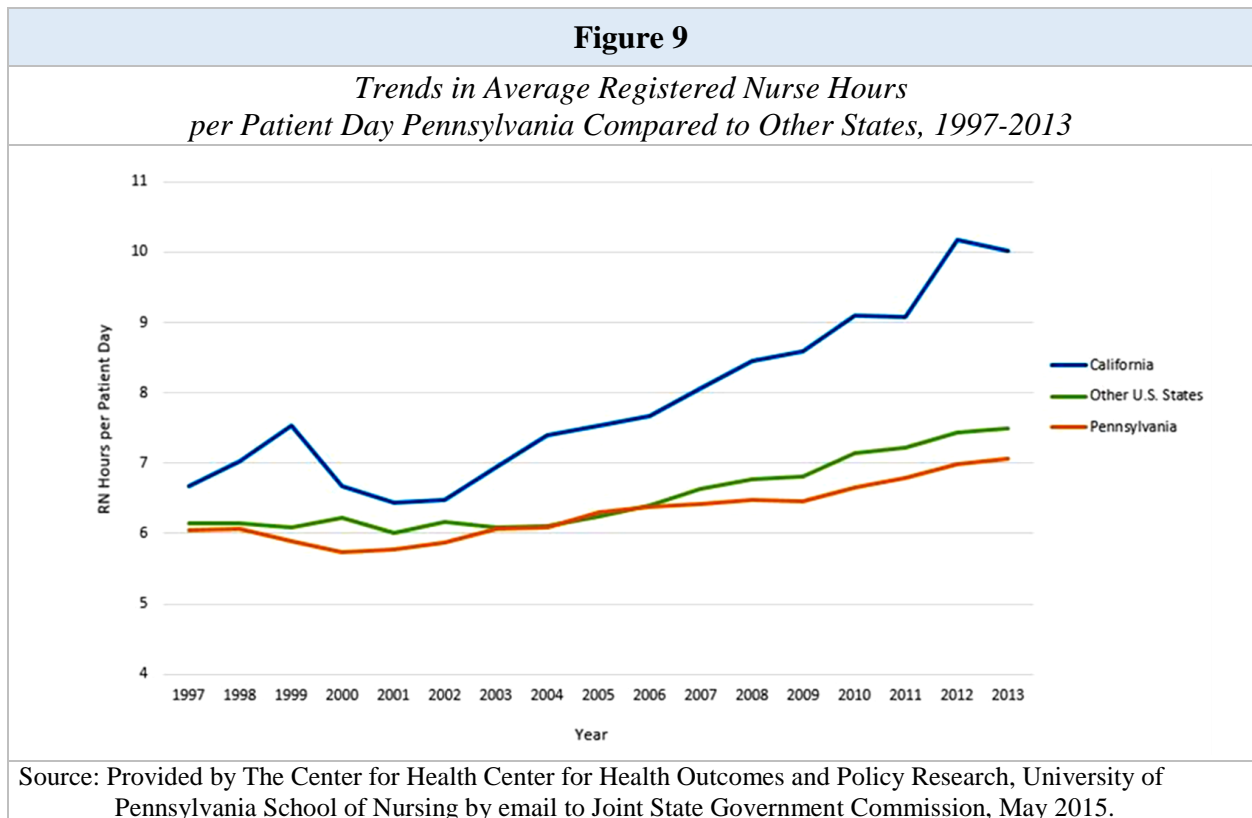




## VARIATIONS AMONG HOSPITALS, UNITS, AND SHIFTS

House Resolution 920 of 2015 directed JSGC to study nurse-staffing levels implemented on a regular and consistent basis in a variety of hospitals in this Commonwealth, reviewed over differing shifts and across all hospital units. Unfortunately, data collection on staffing levels within Pennsylvania hospitals has been scarce. Data provided by the Center for Health Outcomes and Policy Research at the University of Pennsylvania, School of Nursing has provided some insight into what is happening within Pennsylvania hospitals; however, the data does not provide a complete picture.

What is known is that though Pennsylvania has no shortage of nurses, the nurse staffing levels across Pennsylvania hospitals are highly variable and has persisted over the last 14 years. Further, consistent with trends of other states in the United States, staffing levels in Pennsylvania’s hospitals have been increasing over time. Despite the overall growth, however, the rate of increase in Pennsylvania has generally lagged behind that of most other states. From 1997 to 2013, RN hours per patient day have increased from 6 to 7 in Pennsylvania, while the national increase rose slightly higher to approximately 7.5. Figure 9 compares RN hours in California, Pennsylvania, and the average of the other states.



As Figure 9 indicates, the largest difference exists between Pennsylvania and California, the only state with regulations requiring a minimum staffing level across all hospital units.<sup>93</sup> The difference in staffing between Pennsylvania hospitals and California hospitals has grown from an average of less than 1 RN hour per patient day in 1997 to an average of nearly 3 RN hours per patient day in 2013. California’s nursing hours spiked in 1999, dropped quickly in the following two years, and then rose quickly through 2013. Not coincidentally, the state’s minimum registered nurse-to-patient ratios for hospitals were established by law in 1999 with the passage of AB394.<sup>94</sup>

California’s final regulations were issued in July 2003, and the requirements to meet staffing levels went into effect January 1, 2004. Researchers who studied the effects of the California nursing ratios concluded that mandated nurse staffing ratios were associated with lower mortality and nurse outcomes predictive of better nurse retention in California and in other states where mandates existed.<sup>95</sup> California’s ratios are summarized in Table 12.

<b>Table 12</b>	
<i>California RN to Patient Staffing Ratios</i>	
<b>Type of Care</b>	<b>Nurse-to-Patient Ratio</b>
Medical–surgical	1:5
Pediatric	1:4
Intensive care units	1:2
Telemetry	1:5
Oncology	1:5
Psychiatric	1:6
Labor/delivery	1:3
<i>Source: Linda H. Aiken, et al, Implications of the California Nurse Staffing Mandate for Other States, Health Services Research, n.d., DOI: 10.1111/j.1475-6773.2010.01114.x, p. 7.</i>	

<sup>93</sup> “Nurse-to-Patient Staffing Ratio Regulations,” California Department of Public Health, <https://cdph.ca.gov>.

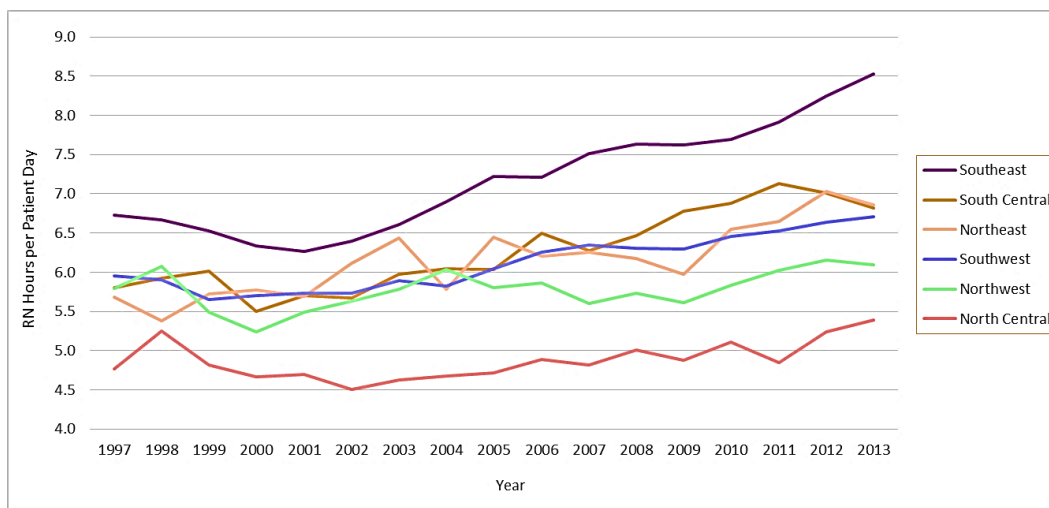
<sup>94</sup> John Kasprak, Senior Attorney, “California RN Staffing Ratio Law,” *OLR Research Report*, Connecticut General Assembly, (February 10, 2004), <http://www.cga.ct.gov/2004/rpt/2004-R-0212.htm>.

<sup>95</sup> Linda Aiken, et al., “Implications of the California Nurse Staffing Mandate for Other States,” *Health Services Research*, n.d., DOI: 10.1111/j.1475-6773.2010.01114.x.

Hospital bedside nurse staffing in Pennsylvania is inconsistent both within individual hospitals and between different hospitals. Researchers concluded that although staffing has generally improved over the years, that is, the number of hours of professional bedside nursing per patient day have increased, there remains substantial variation in average nurse staffing levels across the regions of Pennsylvania, seen in Figure 10. Currently, there is little standardization in nurse staffing from hospital to hospital. Patients cannot, consequently, expect to have similar levels of staffing from one hospital to the next or even shift-to-shift within the same hospital.

**Figure 10**

*Trends in Average Registered Nurse Hours per Patient Day in Pennsylvania, by Region 1997-2013*



Source: Provided by The Center for Health Center for Health Outcomes and Policy Research, University of Pennsylvania School of Nursing by email to Joint State Government Commission, May 2015.

*Staffing Across Unit-Types in Pennsylvania*

Staffing levels vary from unit to unit due to the diverse needs of patients. In general, nurses care for fewer patients in intensive care units compared to more general units, such as medical-surgical units. Table 13 depicts the average patients per nurse by unit type in Pennsylvania in the year 2006.

<b>Table 13</b>	
<i>Average Patients per Nurse by Unit Type in Pennsylvania; 2006</i>	
<b>Staffing by Unit</b>	<b>Average Patients per Nurse</b>
Medical/ Surgical	6.5
Pediatric	4.4
Adult Intensive Care	2.2
Neonatal Intensive Care	2.5
Intermediate Care	2.8
Telemetry	4.5
Oncology	5.7
Emergency Room	8.8
Transitional	7.4
Mental Health	7.9
Nursery/ Postpartum	6.4
Labor/ Delivery	2.8
Operating Room	4.2
Recovery Room	6.0
Long Term Care	8.6
Source: Data from the University of Pennsylvania Center for Health Outcomes and Policy Research.	

### *Variation Across Shifts*

Although there are no data that allow for comparisons across shifts for all of Pennsylvania’s hospitals, evidence does suggest that a lack of consistency from shift to shift is problematic. In a study of one institution that had, in general, very good staffing levels, researchers found that patients exposed to even short durations of understaffing were at much higher risk of poor outcomes, including mortality.<sup>96</sup>

Furthermore, there is a large body of evidence suggesting that patients are at higher risk for poor outcomes during “off-shift” times (nights, weekends, and holidays). This may be due to the lower levels of staffing that is common during these times, which has been shown to be a key factor associated with adverse events.<sup>97</sup> For example, Peberdy et al. found that survival rates from

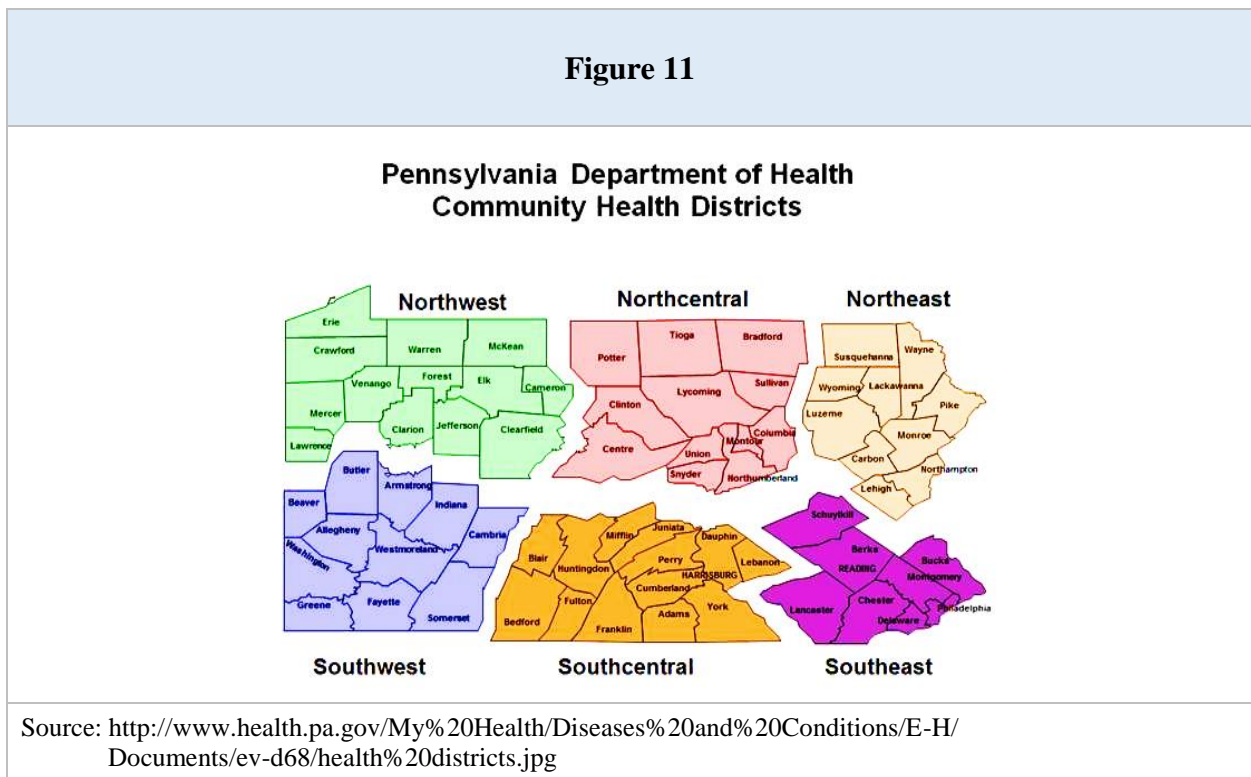
<sup>96</sup> Jack Needleman, et al., “Nurse staffing and inpatient hospital mortality,” *N. Engl. J. Med.* 2011;364(11):1037-1045.

<sup>97</sup> Mary Ann Peberdy, et al., “Survival From In-Hospital Cardiac Arrest During Nights and Weekends,” *JAMA.* 2008;299(7):785-792; DJ Becker, “Do hospitals provide lower quality care on weekends?” *Health Serv. Res.* Aug 2007;42(4):1589-1612; Jack Needleman, et al., “Measuring hospital quality: can medicare data substitute for all-payer data?” *Health Serv. Res.* Dec 2003;38(6 Pt 1):1487-1508; RK Amaravadi, et al., “ICU nurse-to-patient ratio is associated with complications and resource use after esophagectomy,” *Intensive Care Medicine.* Dec 2000;26(12):1857-1862; Pamela de Cordova, et al., “Night and day in the VA: associations between night shift staffing, nurse workforce characteristics, and length of stay,” *Res. Nurs. Health.* 2014;37(2):90-97; JB Dimick, et al., “Effect of nurse-to-patient ratio in the intensive care unit on pulmonary complications and resource use after hepatectomy,” *American Journal of Critical Care.* Nov 2001;10(6):376-382.

in-hospital cardiac arrest were lower during nights and weekends, even when adjusting for complex patients, events, and hospital characteristics.<sup>98</sup>

In 2013, surveys showed professional bedside nurse staffing in Pennsylvania’s general acute care hospitals varied from fewer than 2 hours up to 11 hours per adjusted patient day, with the average being about 6 hours.<sup>99</sup>

Figure 11 displays the six Pennsylvania Department of Health regions utilized in the AHA data. Average staffing levels in 2013 were highest in Southeast Pennsylvania, where there was an average of 8.53 RN hours per patient day and were lowest in North Central Pennsylvania, where there was an average of 5.4 RN hours per patient day.



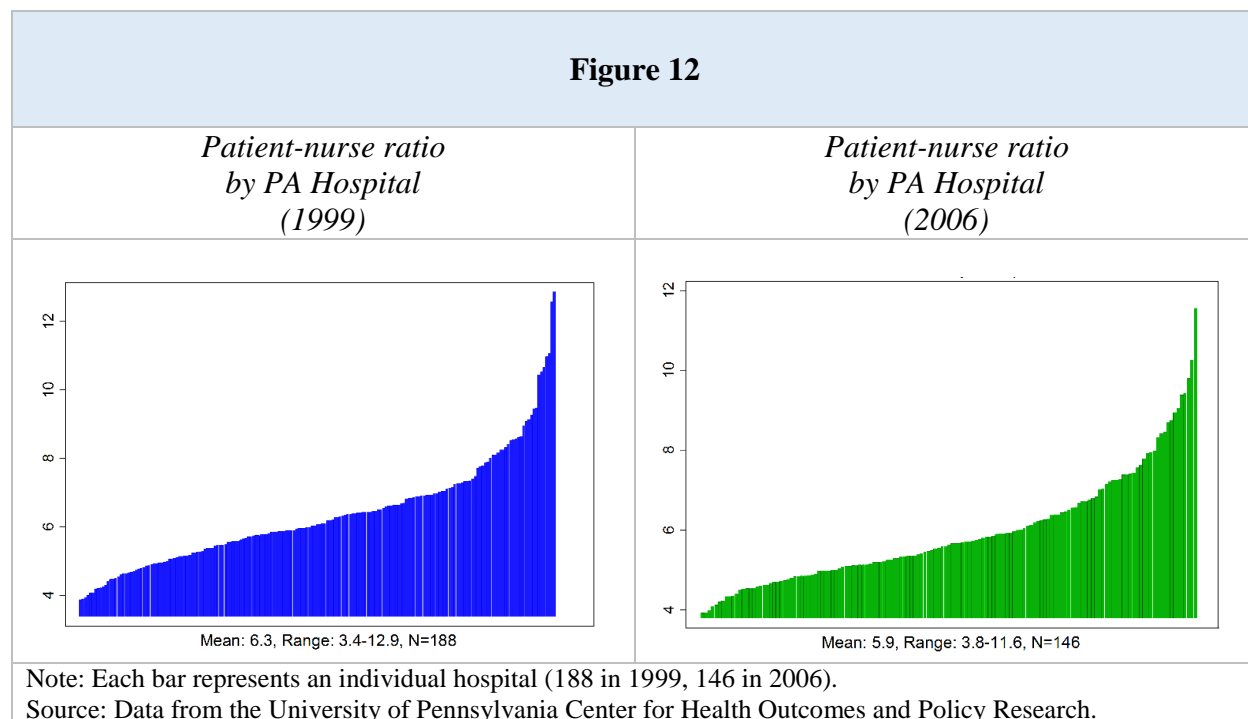
<sup>98</sup> Mary Ann Peberdy, et al., “Survival From In-Hospital Cardiac Arrest During Nights and Weekends,” *JAMA*. 2008;299(7):785-792.

<sup>99</sup> Adjusted patient day is defined as: “an aggregate figure reflecting the number of days of inpatient care, plus an estimate of the volume of outpatient services, expressed in units equivalent to an inpatient day in terms of level of effort. The figure is derived by first multiplying the number of outpatient visits by the ratio of outpatient revenue per outpatient visit to inpatient revenue per inpatient day. The product (which represents the number of patient days attributable to outpatient services) is then added to the number of inpatient days. Originally, the purpose of this calculation was to summarize overall productivity and calculate a unit cost that would include both inpatient and outpatient activities.” *From: AHA DataViewer, American Hospital Association, www.ahadataviewer.com.*

### Variation in Nurse Staffing Across Pennsylvania Hospitals

Nurse staffing levels across Pennsylvania hospitals exhibit a high variability that has persisted since the first survey conducted by the Center for Health Outcomes and Policy Research in 1999. Variability may not be a problem, provided that the staffing ratio remains within acceptable margins; however, since research indicates that higher staffing ratios are correlated with positive outcomes, patient safety and quality of care may be compromised when ratios drop below acceptable levels.

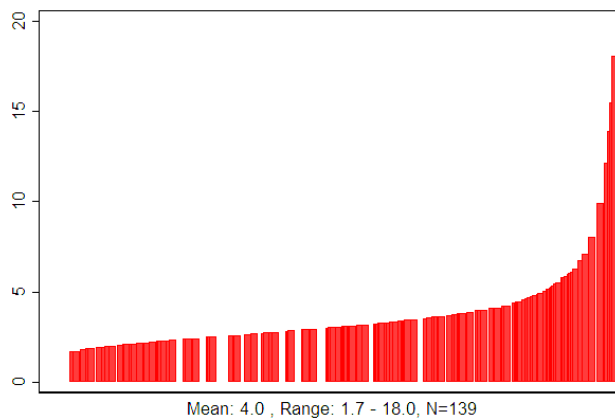
Data from 1999 and 2006 show similar averages of 6.3 and 5.9 patients per nurse, respectively, and both years had large variations from one hospital to the next, shown in Figure 12. In fact, in 1999 one hospital reported an average of 13 patients per nurse, while another reported having a nearly a quarter of that average. Data from 2006 show the lowest average was reported as 3.8 and the highest average as 11.6 patients per nurse. In 2013, data gathered from the American Hospital Association show an alarming increase in the highest average of 18. That same dataset, however, shows the lowest patient-nurse ratio of less than two patients per nurse; with the average nurse caring for four patients. More recent data appears to show that average ratios are generally improving across Pennsylvania’s hospitals. See Figure 13.





**Figure 13**

*Patient-nurse ratio  
by PA Hospital  
(2013)*



Note: Each bar represents an individual hospital (139 in 2013)  
Source: Data from the University of Pennsylvania Center for Health Outcomes and Policy Research.

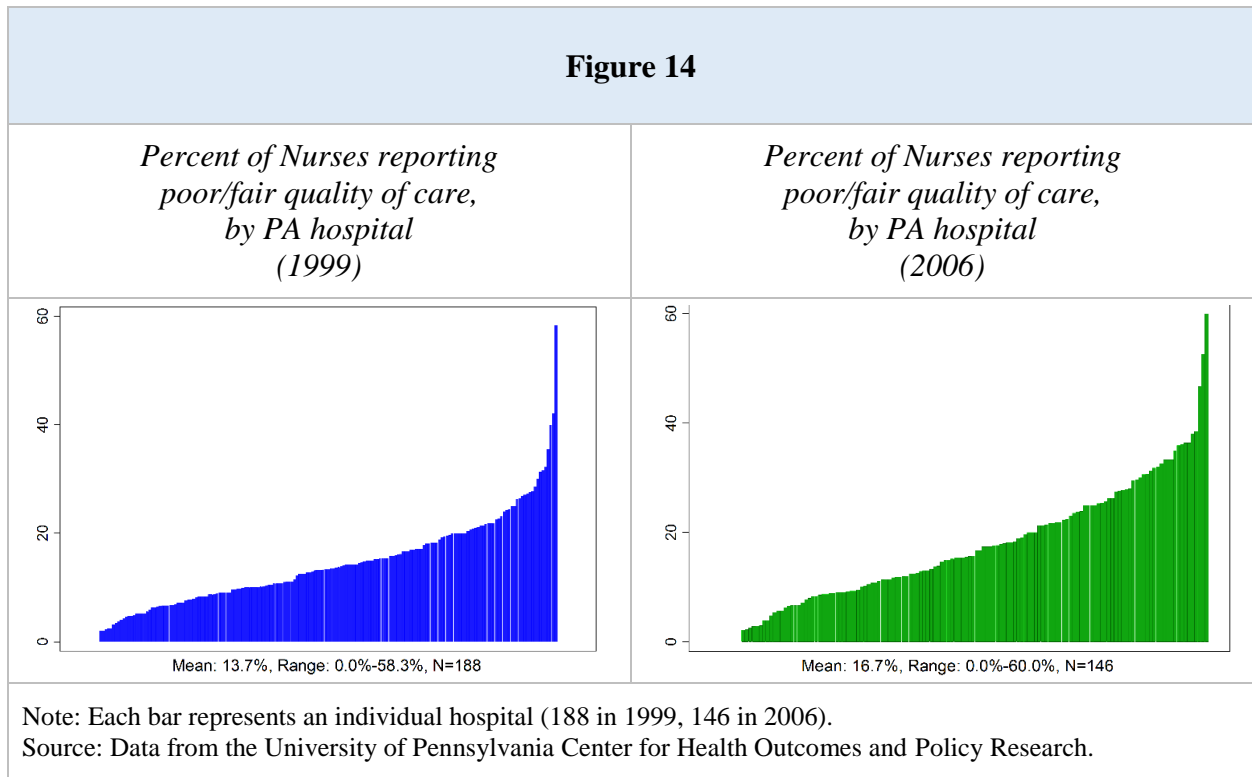
### **Variation in Important Outcomes & Quality Indicators Across Pennsylvania Hospitals**

Researchers have identified several quality of care indicators that can accurately measure and predict the quality of healthcare that hospital patients receive. The nurse-to-patient ratio is perhaps the most robust of these indicators. However, there are other important indicators that describe quality of care in Pennsylvania.

In addition to the variation in staffing, there is correspondingly large variation in a number of these other important quality indicators. Two indicators relay information gathered from nurses' professional opinions about patient outcomes: the nurse-reported quality of care and nurses' confidence that patients can manage care after discharge. Two other quality indicators measures what researchers refer to as nurse outcomes, measuring job dissatisfaction and burnout. Evidence suggests that nurse staffing is linked with each of these four outcome measures.

*Nurses' Perceptions of Quality of Care*

Data from 1999 and 2006 had similar mean percentages (13.7 percent and 16.7 percent) in the number of hospital nurses reporting that they felt patients received low quality of care. The overall range is quite wide, demonstrating that there is a persistent variation in nurses' perceptions of quality from one Pennsylvania hospital to the next.

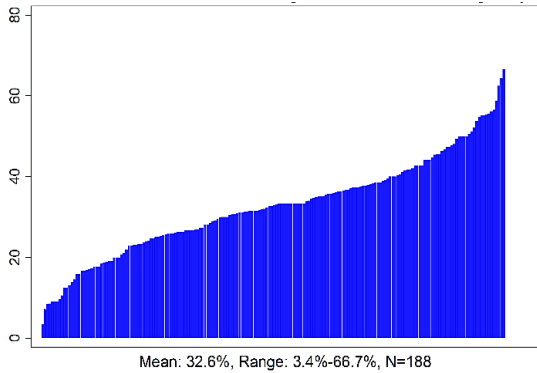


*Nurses' Confidence in Patients After Discharge*

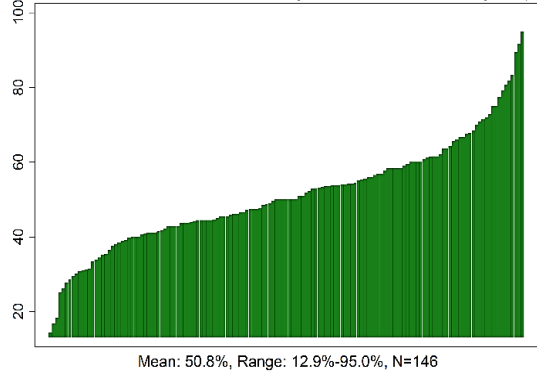
Responses from the two surveys show an increase in the percentages of nurses, from 32.6 percent to 50.8 percent, reporting low confidence in patients' ability to manage care after discharge. This varied widely across Pennsylvania hospitals. The nearly 56 percent increase in the average number of nurses who felt patients were unlikely to receive appropriate care after they leave the hospital is reflected in the overall range of responses. In 1999, the hospital scoring lowest in the survey had 3.4 percent of nurses reporting that they were not confident in patients' ability to receive appropriate care. Seven years later the lowest scoring hospital reported 12.9 percent of nurses' with low confidence in discharged patients, an increase that almost quadrupled the number of nurses with low confidence in patients' ability to receive adequate post-discharge care.

**Figure 15**

*Percent of Nurses not confident patients can manage care after discharge, by PA hospital (1999)*



*Percent of Nurses not confident patients can manage care after discharge, by PA hospital (2006)*



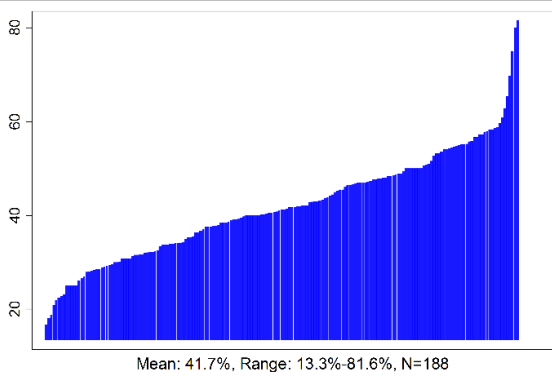
Note: Each bar represents an individual hospital (188 in 1999, 146 in 2006).  
Source: Data from the University of Pennsylvania Center for Health Outcomes and Policy Research.

### *Nurses' Job Satisfaction*

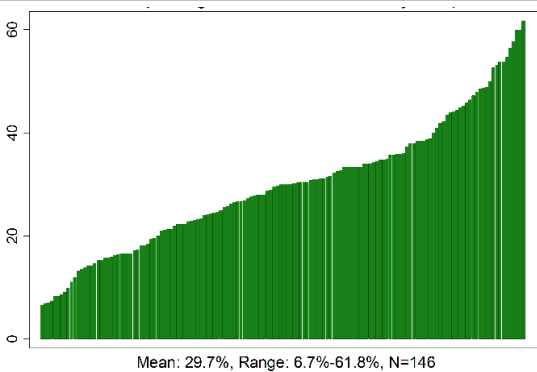
The number of nurses in Pennsylvania who were dissatisfied with their jobs decreased from 1999 to 2006. This dropped the average of 41.7 percent to an average of 29.7 percent. Nonetheless, researchers observe, that nearly 1 in 3 nurses expresses job dissatisfaction.

**Figure 16**

*Percent of Nurses reporting job dissatisfaction, by PA hospital (1999)*



*Percent of Nurses reporting job dissatisfaction, by PA hospital (2006)*

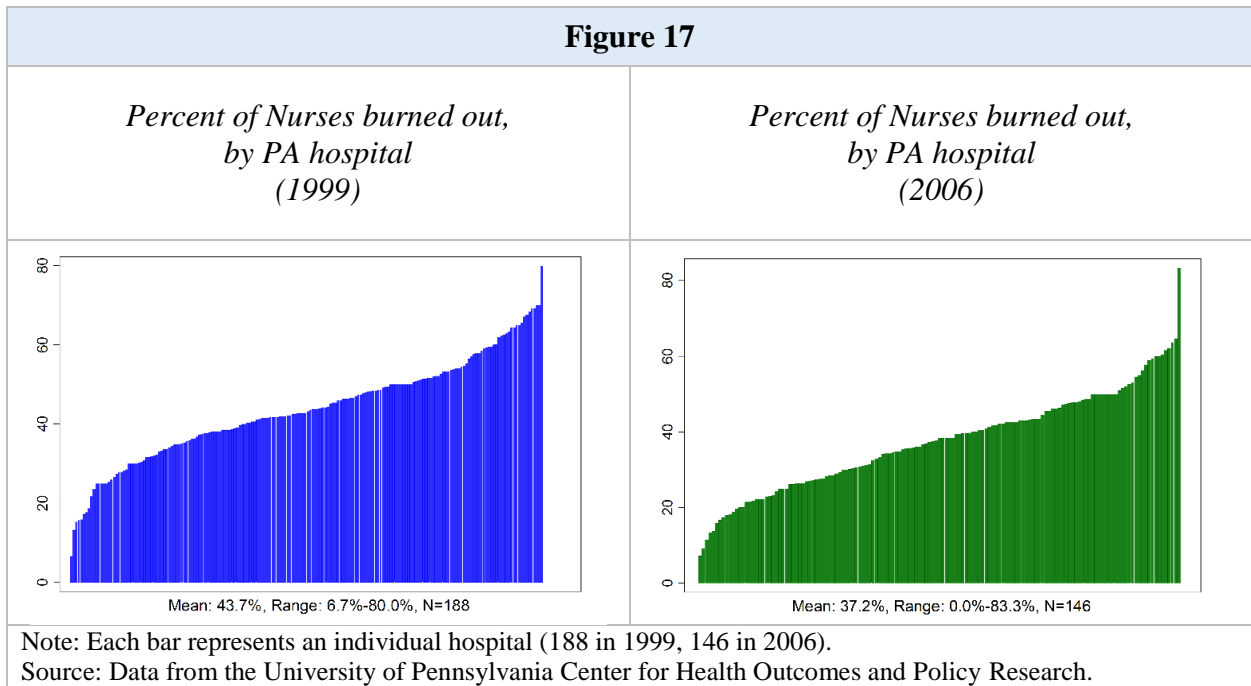


Note: Each bar represents an individual hospital (188 in 1999, 146 in 2006).  
Source: Data from the University of Pennsylvania Center for Health Outcomes and Policy Research.

*Nurse Burnout*

Due to the oftentimes-stressful environment that surrounds direct patient care, nurses experience personal stress and emotional fatigue at alarmingly high rates. A number of professional help resources provide a framework that can support nurses who are suffering from so-called burnout, which is described as follows: Burnout is the frustration, loss of interest, decreased productivity, and fatigue caused by overwork and prolonged stress. The potential consequences of burnout are emotional distress, physical illness, and interpersonal conflict in nursing. In the workplace, burnout leads to low morale, high absenteeism, high turnover rates, and occupational injuries.<sup>100</sup>

Data from 1999 and 2006 showed similar responses from Pennsylvania nurses, with an average of 43.7 percent and 37.2 percent, respectively, reporting burnout. The overall range of nurses reporting burnout varied from one hospital at the low end with 6.7 percent to an alarming 80 percent of nurses reporting burnout at another. The average of 37.2 percent in 2006 was a slight drop from 1999’s average, and was bracketed by a wider spread in the portion of nurses reporting burnout, ranging from 0 percent to 83.3 percent. Evidently, burnout is widespread and varies significantly from one hospital to the next.



<sup>100</sup> Lauren Wisniewski, “What is Nursing Stress, Burnout, or Compassion Fatigue?” [nursetogether.com](http://www.nursetogether.com), (February 5, 2013), <http://www.nursetogether.com/what-nursing-stress-burnout-or-compassion-fatigue#sthash.6aFURARs.dpuf>.

## **2015 NURSE STAFFING LEGISLATION**

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At the time of this report, two bills have been introduced to address the issue of nurse staffing. 2015 House Bill No. 476 (P.N. 0534) and 2015 Senate Bill No. 553 (P.N. 531) aim to improve patient safety within Pennsylvania's general and special hospitals by changing nurse staffing regulations. Though each bill approaches this important issue in a different way, both intend to improve patient outcomes, improve professional satisfaction among nurses, and decrease healthcare costs by ensuring that healthcare facilities are appropriately staffed.

### **2015 House Bill No. 476 (P.N. 0534)**

2015 House Bill No. 476 (P.N. 0534) would amend the act of July 19, 1979 (P.L. 130, No. 48), known as the Health Care Facilities Act, by providing for professional nurse staffing standards. In essence, the amendment would require hospitals to establish a committee within their facilities to address nurses' concerns. Each hospital would be required to implement and monitor a professional nurse staffing plan for each of its units. The plan would be developed internally by the established committee and would meet no less than two times each year to discuss implementation, barriers to implementation, and other concerns related to staffing plans.

Each committee would be comprised equally of administrative staff and professional nurses who are currently providing direct patient care within the hospital. Professional nurses would be selected by their peers on an anonymous basis to serve on the committee. Administrative staff would be appointed at the discretion of the board of directors or president of the hospital; at least one individual must have experience with the hospital's budget or financial condition. The staffing committee would elect a chairperson who is a professional nurse that provides direct patient care.

Upon enactment of the amendment, hospitals must establish at least one staffing committee within 120 days. Hospitals would be required to provide the education and parameters necessary for staff to responsibly develop a staffing plan within 180 days of the effective date. The hospital must adopt the plan in a timeline that is consistent with the hospital budgetary planning process. The final and approved plan would be made accessible to all nursing staff.

The staffing committees would have to develop a plan that takes into consideration variables that can influence the staffing plan for that hospital unit. These variables include, but are not limited to, the following:

- The special skills and competencies required by the nursing staff in that hospital unit to provide care to the hospital unit's patient population to ensure the delivery of quality care and quality outcomes.
- Staffing standards recommended by nationally recognized professional nursing organizations, particularly those that address professional standards of care for the selected patient population.
- Staff skill mix, specialty certification, and years of experience.
- The numbers and types of other professional, paraprofessional, or support staff that professional nurses must collaborate with or supervise to ensure the delivery of quality care and quality outcomes.
- Patient volume, patient acuity, nursing care intensity, and patient turnover issues that can affect the numbers and types of staff required for the patient population in a hospital unit.
- The time needed to complete various key nursing tasks, including, but not limited to, surveillance, patient assessment, patient education and discharge planning.
- The physical environment in which care is provided, including, but not limited to, the physical architecture of each hospital unit, patient location and available technology of the health care facility.

The plan would be voted on and would require a majority vote of two-thirds of the staffing committee. The staffing committee would review the plan at least twice annually.

The hospital would also have the responsibility of developing and implementing a plan of action, with the assistance of professional nurses who provide direct patient care and other appropriate staff, if there is evidence of noncompliance with the staffing plan and the noncompliance negatively impacts patients and professional nurses. Additionally, a process must be established where immediate concerns about nurse staffing can be reported and addressed within nursing. A mechanism for nursing staff to raise concerns and make recommendations about the staffing plans, either through the existing staffing committee or nursing administration, or both, would also need to be developed.

Furthermore, hospitals would have to ensure that chief nursing officers receive periodic reports from the staffing committee to ensure that consistent information is captured. The committee would also receive reports from other existing hospital committees if relevant to nurse staffing.

An annual report, for internal purposes, would be provided to the chief executive officer, the staffing committee, and the governing board relating to nurse staffing. This report would include, but would not be limited to, compliance with the approved nurse staffing plans and any actions taken to address nurse staffing issues. Patients would need to have access to information on how to make a request for the staffing plan.

Importantly, general and specialty hospitals would be required to comply with the act of December 12, 1986 (P.L.1559, No.169), known as the Whistleblower Law, and section 307(b)(4) of the act of March 20, 2002 (P.L.154, No.13), known as the Medical Care Availability and Reduction of Error (Mcare) Act.

The Department of Health (PADOH) would be responsible for developing a form to be completed by an individual designated by the department to inspect a hospital under section 806.4 of the Health Care Facilities Act. PADOH may impose an administrative penalty of \$1,000 per day upon any hospital not in compliance and shall promulgate regulations necessary to implement the duties and responsibilities of the staffing committee.

#### *Bill Analysis*

Staffing committees would help to standardize staffing within hospitals, however, without a specific nurse-to-patient ratio hospitals could still vary widely in their staffing in ways that have demonstrated implications for safety. Further, though the bill allows for patients to request information, there is no public reporting system for staffing in place that would make this information readily available to patients. By the time they receive this information, through a formal request, it may already be too late for the patient to use the information.

#### **2015 Senate Bill No. 553 (P.N. 531)**

2015 Senate Bill No. 553 (P.N. 531) would amend the act of July 19, 1979 (P.L. 130, No. 48), known as the Health Care Facilities Act, by providing for hospital patient protection. The amendment would set nurse-to-patient staffing ratios guidelines, and would provide other protections for direct care nurses and their patients.

A nurse-to-patient ratio represents the maximum number of patients that can be assigned to one direct care registered nurse at all times. Nurse administrators, nurse supervisors, nurse managers, charge nurses, and case managers cannot be included in the calculation of the direct care registered nurse-to-patient ratio. Averaging of the number of patients and the total number of direct care registered nurses on the unit during any one shift or over any period of time is not permitted. The ratios are detailed in the bill by unit and certain patient events.

Further, the amendment would permit a direct care nurse to refuse a patient assignment in the event that “the nurse does not have the necessary knowledge, judgment, skills, and ability to provide the required care without compromising or jeopardizing the patient’s safety, the nurse’s ability to meet foreseeable patient needs or the nurse’s license”. Additionally, the policy would permit a direct care nurse to assess an order initiated by a physician before implementation. This would be to ensure that it is in the best interest of the patient, has been initiated by a person legally authorized to do so, and is in accordance with applicable laws and regulations governing nursing care. Nurses refusing assignments or implementation of an order under a work assignment policy would not be deemed negligent or in violation of nursing law.

The amendment would also protect nurses’ professional duties and right of patient advocacy, as well as their freedom of speech. Registered nurses, and other health care professionals who provide patient care, would have the right to act as a patient’s advocate, including protection for whistleblowing. Whistleblower protections would prohibit discharge or retaliation for reports of unsafe practices or violations of policy, regulation, rule, or law within the hospital.

Other protected rights in this amendment include opposition of policies, practices, or actions of the hospital, in addition to the right to cooperate with an investigation or complaint proceeding. Hospitals would be prohibited from interfering with any of the protected rights that are laid out in the amendment. Hospitals and other medical employers would be prohibited from discriminating or retaliating against a person, whether that be a patient, employee, or contract employee, for protected actions.

The bill would also require hospitals to adopt an acuity-based patient classification system. The bill defines this system as a standardized set of criteria based on scientific data that acts as a measurement instrument used to predict registered nursing care requirements for individual patients based on various criteria. Some of the criteria includes the severity of patient illness, the ability for self-care, including motor, sensory and cognitive deficits, and a unit’s geographic layout. The system determines the additional number of direct care registered nurses and other licensed and unlicensed nursing staff the hospital must assign, based on the independent professional judgment of the direct care registered nurse, to meet the individual patient needs at all times.

Based on individual patient care needs as determined by the system, hospitals would develop a written staffing plan. This plan would be designed by the chief nursing officer or a designee. It would be developed and implemented for each patient care unit and would specify individual patient care requirements and staffing levels for direct care registered nurses and other licensed and unlicensed personnel. Staffing requirements, actual staff, staff mix, and the variance between required and actual staffing patterns would need to be documented and posted on the unit for public view on a day-to-day, shift-by-shift basis.



A review committee would be established to conduct an annual review of the acuity-based patient classification system. At least half of the committee would be comprised of unit-specific, competent direct care registered nurses. The members would be appointed by the chief nurse officer, except where direct care registered nurses are represented for collective bargaining purposes, all direct care registered nurses on the committee would be appointed by the authorized collective bargaining agent.

The role of the committee would include checking the reliability of the system for validating staffing requirements to determine whether the system accurately measures individual patient care needs and completely predicts direct care registered nurse, licensed practical nurse, and certified nursing assistant staffing requirements based exclusively on individual patient needs. In the event that adjustments are necessary, changes would need to be made within 30 days of that determination.

Other staffing plan requirements would include developing a process for all interested staff to provide input about the system's required revisions and the overall staffing plan, as well as a plan for routine fluctuations, such as admissions, discharges, and transfers in patient census. Additionally, in the event of a health care emergency, the hospital would need to demonstrate that immediate and diligent efforts were made to maintain required staffing levels.

Hospitals found in violation of the requirements in the bill would be subjected to fines and civil penalties. Fines and penalties depend on the section of the amendment they have been found to be in violation of. Furthermore, health care facilities found in violation of the rights of an employee as laid out in the amendment could be held liable to the employee in an action brought in a court of competent jurisdiction.

### *Bill Analysis*

Patient safety is a complex issue that cannot be solved with a singular solution. 2015 Senate Bill No. 553 provides specific unit-specific nurse-to-patient ratios, which is more stringent than what was implemented in California. Though specific nurse-to-patient ratios provide a standardization of a minimum level, giving consumers confidence in baseline safety, current research does not draw a hard line at the minimum ratios necessary for patient safety.

If specific ratios are desired, an alternative approach mirroring the process undertaken in California should be considered. At the direction of the Pennsylvania Legislature, this approach would authorize the Pennsylvania Department of Health to create the specific nurse-to-patient ratios based on an evaluation of the evidence, state-specific needs, and stakeholder input.

## RECOMMENDATIONS

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The recommendations are based on the statistics and research made available to JSGC and are discussed in detail in the substantive chapters of this report. The recommendations focus on improving patient safety across all Pennsylvania hospitals. Included below are cross-references to the pages containing the background and rationale for each recommendation.

### **Recommendation 1**

*Improve nurse workforce data collection and analysis.*

**1.1** There is limited data available to allow for the evaluation of the questions posed in HR 920. Through a large federally funded research project The University of Pennsylvania was able to provide JSCG with a more complete picture than would have been available if not for these federal grants.

Currently, Pennsylvania has a mechanism for collecting data through surveys when nurses renew their licenses, which is done by the Department of Health, Bureau of Health Planning in cooperation with the Department of State, Bureau of Professional and Occupational Affairs. To-date, this mechanism has not collected information on nurses' place of employment, which would provide a means to derive measures of staffing and quality of care for each of Pennsylvania's hospitals.

Data should be collected on staffing, work environment, education level, burnout, job satisfaction, and intent to leave, and should be directly linked with specific facilities. Being able to link data to hospitals, rather than just having a population survey, is important in holding hospitals accountable for their outcomes.

**1.2** The Patient Safety Authority should collect data that specifically relates to adverse events caused by inadequate staffing. The current data collection method for adverse events does not list inadequate staffing as an option and can only be written in, making these situations difficult to track. See the discussion beginning on page 5 for further detail on the connection between nurse staffing levels and adverse events.

**1.3** Data collection is also lacking for overtime in Pennsylvania. Since Act 102 was implemented in 2009 the state has not collected data on this topic. Due to this lack of data it is not known if the law has made an impact on overtime in Pennsylvania. See the discussion on page 31 for detail on length of shifts and overtime in Pennsylvania.

### **Recommendation 2**

*Pennsylvania should consider implementing a public reporting system for hospital staffing levels.*

Similar to other states, Pennsylvania should implement a public reporting mechanism where hospitals submit staffing levels. This type of reporting would allow patients to make informed decisions about the hospital where they choose to receive care, in addition to providing information on questions posed in HR 920 where data were not available.

For example, New Jersey has implemented a staffing level reporting system. New Jersey's mechanism requires that the Department of Health and Senior Services to issue quarterly reports for each general hospital that show average staffing levels for a three-month period. This type of policy is considered on page 18.

### **Recommendation 3**

*Hospitals should consider consistency of nurse staffing during “off-shifts” (nights, weekends, holidays).*

Currently, there are no Pennsylvania specific data that allow for comparisons across shifts in Pennsylvania's hospitals. However, evidence shows that patients are at higher risk for poor outcomes during “off-shift” times, often due to lower levels of staffing that frequently occur during this time. See discussion starting on pages 5 and 44.

### **Recommendation 4**

*Pennsylvania hospitals should make improvements to the nurse work environment.*

Multiple studies show that improvements to nurse staffing will not have a significant effect on adverse events if not paired with a good work environment. Nurses in good work environments have greater autonomy, control over their practice and resources, managerial support, and excellent working relationships and communication with physicians. The effect of the nurse work environment on patient safety is discussed throughout the report.

### **Recommendation 5**

*Increase the percent of nurses in Pennsylvania with a Bachelor's of Science Degree in Nursing.*

Pennsylvania should develop a plan to encourage current nurses with an associate or diploma degree to obtain a BSN degree, in addition to encouraging future nurses to obtain a BSN initially. This is in line with The Institute of Medicine's recommendation that by the year 2020, 80 percent of RNs have a BSN. Currently only 39 percent of RNs have a BSN. Various studies have shown that having a higher percentage of the nurse workforce with at least a BSN degree is associated with better patient outcomes. See relevant discussion beginning on pages 5 and 22.

### **Recommendation 6**

*Pennsylvania should extend the whistleblower protection law to include nurses.*

Currently, nurses are not protected by Pennsylvania's whistleblower protection laws. Whistleblower protections are provided in 2015 House Bill No. 476. This bill is summarized beginning on page 51.



PRIOR PRINTER'S NO. 3818

PRINTER'S NO. 3882

THE GENERAL ASSEMBLY OF PENNSYLVANIA

HOUSE RESOLUTION

No. 920 Session of 2014

INTRODUCED BY GINGRICH, COHEN, CALTAGIRONE, PICKETT, THOMAS, VEREB, V. BROWN, D. COSTA, MUSTIO, MILLARD, READSHAW, M. K. KELLER, BOBACK, HELM, SWANGER, DENLINGER, B. BOYLE, MENTZER, HARPER, SAYLOR, HARHART, WATSON, ADOLPH, KULA, BROOKS, GROVE, MILNE, MURT AND FRANKEL, JUNE 24, 2014

AS AMENDED, HOUSE OF REPRESENTATIVES, JUNE 27, 2014

A RESOLUTION

1 Directing the Joint State Government Commission to study the  
2 issue of professional bedside nurse staffing; and to report  
3 to the House of Representatives with its findings and  
4 recommendations to implement potential changes in State laws,  
5 practices, policies and procedures relating to safe nurse  
6 staffing.

7 WHEREAS, Recent reports describe an association between  
8 staffing reductions and unsafe levels of staffing and higher  
9 rates of adverse outcomes for patients; and

10 WHEREAS, The odds of a professional bedside nurse making an  
11 error during a shift of 12.5 hours or more are three times  
12 greater than during a shift of 8.5 hours or less; and

13 WHEREAS, Professional bedside nurse staffing levels are the  
14 average number of patients under the license of a single non-  
15 supervisory professional bedside nurse at any given time, over a  
16 single shift in a given hospital; therefore be it

17 RESOLVED, That the Joint State Government Commission study  
18 recent reports of serious adverse events in hospitals and the

1 connection these adverse events have to professional bedside  
2 nurse staffing; and be it further

3       RESOLVED, That the Joint State Government Commission study  
4 demographics and length of stay for professional bedside nurses;  
5 and be it further

6       RESOLVED, That the Joint State Government Commission study  
7 lengths of shifts and overtime requirements for professional  
8 bedside nurses, per unit; and be it further

9       RESOLVED, That the Joint State Government Commission study  
10 professional bedside nurse staffing levels that are implemented  
11 on a regular and consistent basis in a variety of hospitals in  
12 this Commonwealth, reviewed over differing shifts and across all  
13 hospital units; and be it further

14       RESOLVED, That the final report include recommendations to  
15 implement potential changes in State laws, practices, policies  
16 and procedures relating to professional nurse staffing; and be  
17 it further

18       RESOLVED, That the Joint State Government Commission issue  
19 the report to the House of Representatives with its findings and  
20 recommendations no later than ~~six months~~ ONE YEAR after adoption <--  
21 of this resolution.