



## EXECUTIVE INSIGHTS

# The US Nursing Shortage: The Gap Could Reach 400K Hospital RN FTEs in 2027

## The US RN shortage is a long-standing and worsening issue

The COVID-19 pandemic increased the visibility and urgency of a broad range of challenges to the U.S. healthcare system. The U.S. hospital nurse shortage was at the forefront, with estimated job vacancy<sup>1</sup> rates spiking nearly 70% from 2020 to 2021.

However, this shortage is not new — in fact, the topic has been written about for decades (e.g., “Where Have All the Nurses Gone?”<sup>2</sup>). And yet, the pre-pandemic drivers of the shortage are not intuitively clear. The total supply of hospital registered nurse (RN) full-time equivalents (FTEs<sup>3</sup>) within U.S. hospitals (and sites wholly owned by individual hospitals) has grown faster than has the total U.S. population since at least 2010 (the hospital RN FTE population grew 2.1%<sup>4</sup> annually while total U.S. population grew 0.6% per year<sup>5</sup> from 2010 to 2021),<sup>6</sup> yet hospital RN vacancies have continued to increase (see Figure 1).

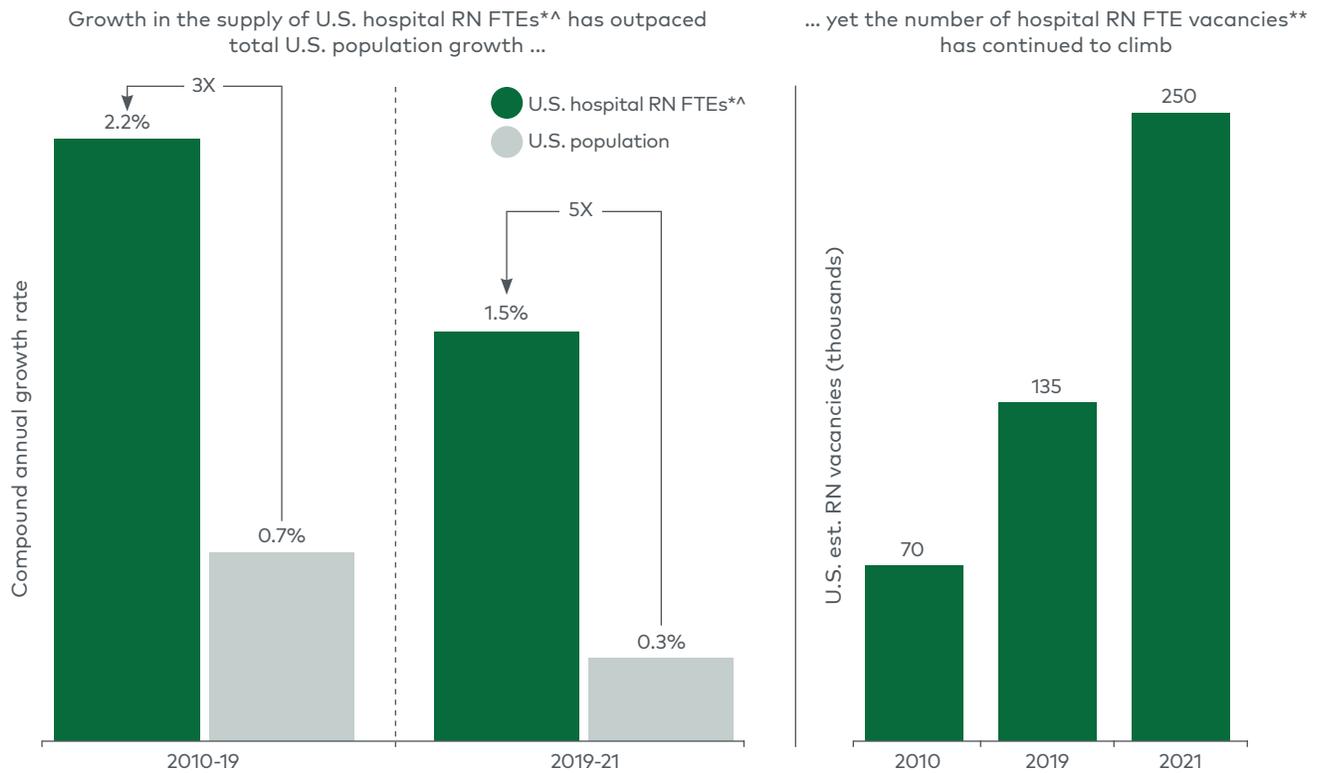
## Much remains unknown about the current US nurse shortage and its outlook

Despite the many unknowns, publications addressing this issue rarely provide an assessment of the shortage within historical, current and forecast contexts. In part, this is because labor supply/demand forecasts often assume that demand quantity equals supply in the baseline year, which is an oversimplification.<sup>7</sup> In this *Executive Insights*, we provide greater context and quantify the hospital RN shortage to explore the following:

- What has been driving incremental demand for nursing capacity in U.S. hospitals
- The current extent of the hospital RN supply-and-demand gap
- What we can expect to see over the next five years
- Implications and considerations for healthcare organizations managing the discrepancy in nursing staff

**Figure 1**

Hospital RN FTE supply growth, US population growth and estimated hospital RN FTE vacancies (2010-2021)



\*FTE equates to American Hospital Association's (AHA) full-time equivalent calculated (FTEC) in this article (FTEC = full-time on payroll + part time on payroll / 2); per AHA, includes staff associated with "all activities that are wholly owned by the hospital, including subsidiary corporations, regardless of where the activity is physically located"; this applies to all references to FTE in this article

<sup>A</sup>Includes hospital RN FTEs and estimated travel nurse FTEs working in hospitals

\*\*Adjusted from headcount vacancies to FTE vacancies using full-time and part-time hospital RN data from the American Hospital Association (AHA), and grossed up for hospitals that do not report vacancies based on the share of FTE RNs out of total that are from vacancy-reporting hospitals

Note: FTE=full-time equivalent; RN=registered nurse

Source: Analysis of American Hospital Association Annual Survey data (2010-2021); Staffing Industry Analysts data (2020-21); Bureau of Labor Statistics data (2014-19); Woods & Poole data (2010-2021); and L.E.K. intellectual property

## Historical context: Demand for nursing (2010-2022)

### Prior to COVID-19 (2010-19): Growing demand due to demographic shifts and care delivery transformation

From 2010 to 2019, the U.S. care delivery landscape saw considerable change:

- The U.S. population continued to age, and chronic-condition prevalence increased, leading to increased healthcare utilization
- The impetus to shift care to lower-cost settings increased outpatient care, both within and outside hospital systems
- Total inpatient volume declined only modestly, but inpatient acuity increased
- The Affordable Care Act (ACA) increased access to care while also accelerating the transition to value-based care, creating additional nonbedside roles for nurses

- **Aging population and increased chronic-condition prevalence**

Demographic factors impacted demand for U.S. nurses from 2010 to 2019. While the size of the U.S. population aged 65 and older grew by 3.3% annually (2010-19 CAGR),<sup>8</sup> the population suffering from chronic conditions increased by 1.1% per year (2010-20 CAGR).<sup>9</sup> These factors contributed to outsized utilization growth, as illustrated by 2.4% annual growth in real hospital and professional services healthcare spend per capita (2010-19 CAGR).<sup>10</sup>

- **Shift toward outpatient care**

As part of the drive to divert care to lower-cost but clinically appropriate settings and improve patient convenience, utilization of outpatient settings has increased. From 2010 to 2019, the number of outpatient visits at hospitals and other sites wholly owned by individual hospitals grew considerably — emergency room visits by 1.1% per year and other outpatient visits by 2.1% per year,<sup>11</sup> which increased demand for nurses.

- **Increased acuity in the inpatient setting**

Despite hospital inpatient days declining by 1.6% annually from 2010 to 2014, the number remained relatively stable from 2014 to 2019 (0.3% annual growth), resulting in a modest yearly decrease of 0.5% from 2010 to 2019.<sup>12</sup> However, inpatient wards experienced higher patient acuity mix; from 2013 to 2019, the number of Original Medicare inpatient discharges with major complications and comorbidities increased by 3.6% annually.<sup>13</sup> With inpatient wards requiring more nurse capacity to care for higher-acuity patients, nurse demand continued to rise during that period.

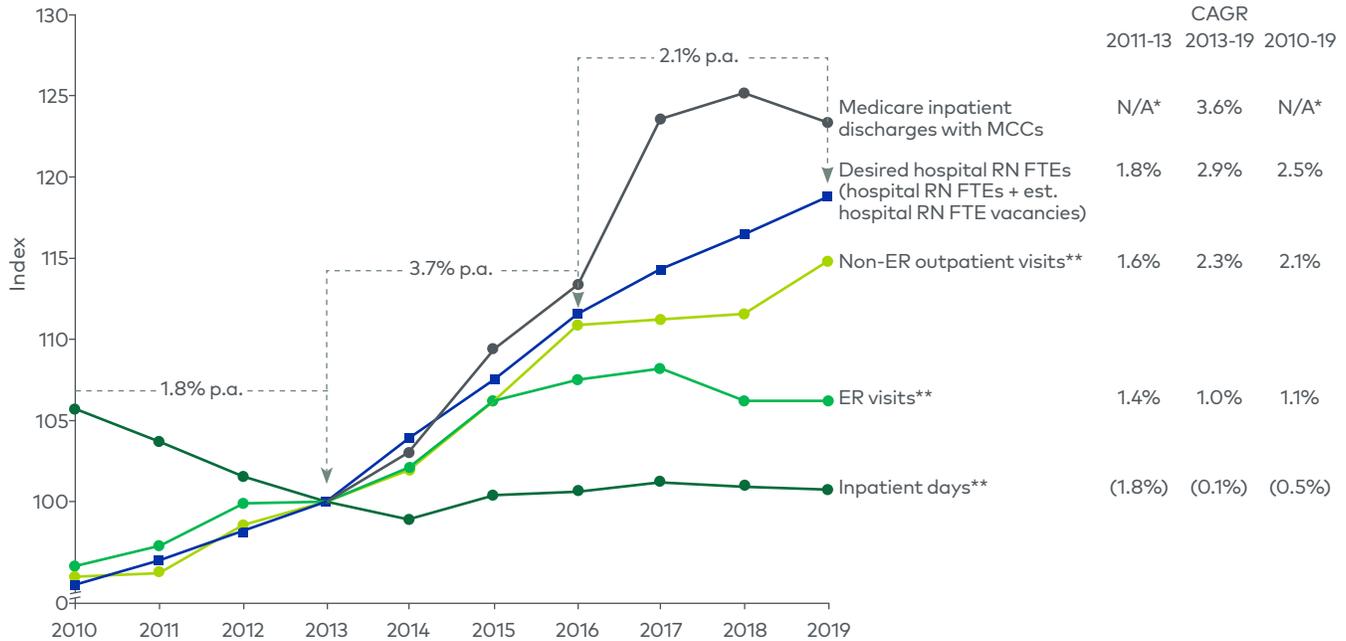
- **Enhanced access to care and demand for nonbedside roles driven by ACA**

The ACA improved access to care, particularly from 2014 on, when the national Health Insurance Marketplace opened and Medicaid expansion began. In fact, growth in non-ER outpatient visits at hospitals and other sites wholly owned by individual hospitals was 3.5% per year from 2013 to 2016, greater than it was in 2010-13 (1.6%) or 2016-19 (1.1%). The transition to value-based care was also accelerated by the ACA, creating additional demand to use RN time for completing nonbedside, administrative tasks (e.g., risk coding, care coordination).<sup>14</sup>

- **Quantifying demand growth from 2010 to 2019**

From 2010 to 2019, hospital demand for RNs (defined as RN FTEs plus estimated FTE vacancies) grew by 2.5% annually (see Figure 2). From 2010 to 2013, demand (the blue line) largely tracked growth in outpatient visits. From 2013 to 2019, demand substantially outpaced growth in outpatient visits, highlighting how higher inpatient acuity, improvements in access to care and growing nonbedside roles due to ACA expansion also drove demand.

**Figure 2**  
Demand and select drivers of demand for hospital RN FTEs – 2013 indexed to 100 (2010-19)



\*CMS Medicare Inpatient Hospitals by Geography and Service unavailable prior to 2013  
 \*\*Per AHA, includes “all activities that are wholly owned by the hospital, including subsidiary corporations, regardless of where the activity is physically located”  
 Note: MCCs= multiple chronic conditions; FTEs=full-time equivalents; RN=registered nurse; ER=emergency room; CAGR=compound annual growth rate  
 Source: L.E.K. analysis of American Hospital Association Annual Survey data (2010-19) and CMS Medicare Inpatient Hospitals – by Geography and Service data set (2013-19)

**The COVID-19 pandemic (2020-22): The changing nature of demand**

COVID-19 further stressed a system already facing a nurse shortage.

- In 2020, hospital utilization declined across ER visits, non-ER outpatient visits and inpatient days as non-COVID-19 patients avoided seeking care and hospitals canceled or reduced elective procedures<sup>15</sup>
- The crisis level of demand for COVID-19 care led hospitals to redeploy some of their workforce from their current departments to intensive care/COVID-19 units<sup>16</sup>
- In 2021, ER visits remained more than 10% lower than 2019 levels, inpatient days rebounded to 2019 levels and non-ER outpatient visits rose to 2.7% higher than 2019 levels, indicating that volume had largely returned to pre-pandemic norms<sup>17</sup>

**Historical context: The nurse population, or ‘supply’ (2010-2022)**

**Prior to COVID-19 (2010-19): Growth despite constrained nurse education capacity**

Unlike what a casual observer might expect, the size of the U.S. RN workforce in fact increased every year since at least 2008, growing from approximately 2.7 million in 2010 to approximately 3.2 million in 2019 (2.2% CAGR).<sup>18</sup> Similarly, the number of RN FTEs working at hospitals increased from about 1.5 million in 2010 to about 1.8 million in 2019 at a 2.2% CAGR.<sup>19</sup>

Nurse population growth is a function of two factors: new entrants into and exits from the profession. While the number of entrants into the workforce (those who passed the National Council Licensure Examination for RNs (NCLEX-RNs)) grew 2.3% annually from 2010 to 2019 — up to about 170,000 by 2019<sup>20</sup>— a lack of training capacity, largely driven by faculty shortages,<sup>21</sup> constrained growth. In 2019, for example, approximately 68,000 qualified applications (not applicants) were rejected from entry-level baccalaureate nursing programs for that reason.<sup>22</sup>

Given the constraints on training, exits<sup>23</sup> from the profession are the primary driver of total nursing capacity. From 2010 to 2019, 2.5% of RNs left the profession each year on average.

### **The COVID-19 pandemic (2020-22): Spike in exits exacerbates shortage**

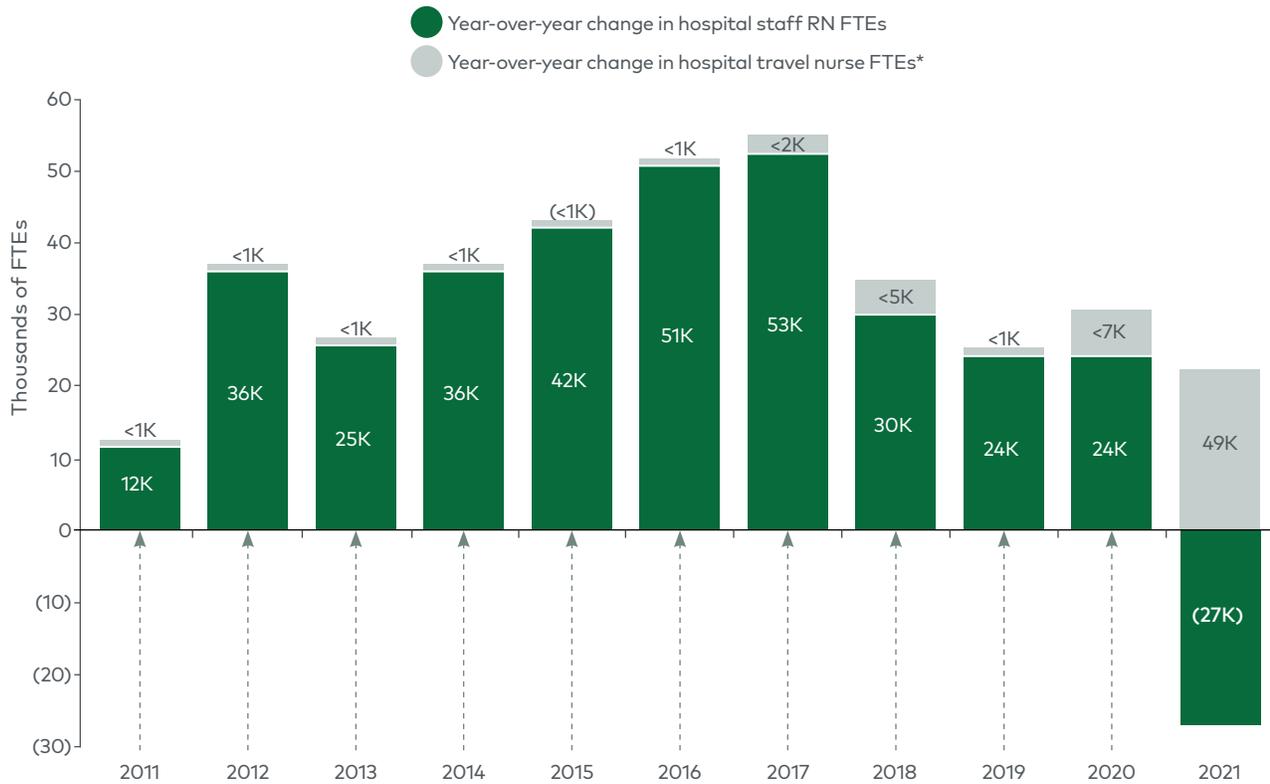
U.S. RNs were on the front lines of the COVID-19 pandemic and faced severe, countless challenges. A 2021 survey found that approximately 75% of surveyed nurses across care settings felt stressed and about 62% felt overwhelmed.<sup>24</sup> The survey also indicated that approximately 50% of nurses stated they intended to (21%) or might (29%) leave their position in the next six months. A reason cited by nearly half of those intending to leave was the negative effect of work on their health and well-being.

Many did leave, and exits from the profession spiked relative to historical norms. According to American Hospital Association (AHA) data, hospital staff RN FTEs declined by 1.5% in 2021,<sup>25</sup> the only decline in the 2010-2021 period (see Figure 3). That same year, estimated hospital RN FTE vacancies increased by nearly 70%, reaching about 250,000.<sup>26</sup> And from 2021 to 2022, enrollment in bachelor of science in nursing (BSN) programs declined by 1.4%, the first year of decline since 2000.<sup>27</sup>

During this time, hospitals sought out travel nurses to supplement their supply of nurse staff. The travel nurse market<sup>28</sup> grew to \$27.6 billion in 2021, nearly tripling from the prior year.<sup>29</sup> There were 30,000 to 40,000 hospital travel nurse FTEs in 2019, compared with 90,000 to 100,000 in 2021 and 120,000 to 140,000 in 2022.<sup>30</sup> L.E.K. Consulting's analysis of historical supply and demand data suggests that even after adding travel nurses to the hospital RN supply, the U.S. hospital RN shortage reached approximately 150,000 FTEs in 2021, up from 80,000 to 120,000 in 2019.

Data from staffing company Vivian Health suggests that as of late 2022, average U.S. travel nurse pay had fallen from its early 2022 peak as some of the most acute COVID-19-related drivers subsided, but the amount is still significantly elevated relative to pre-pandemic levels.<sup>31</sup>

**Figure 3**  
 Year-over-year change in the number of US hospital RN FTEs employed and US hospital travel nurse FTEs (2010-2021)



\*2010-13 data not available, but travel nurse market as percentage of nurses assumed to be similar to 2014-19

Note: RN=registered nurse; FTEs=full-time equivalents

Source: L.E.K. analysis of American Hospital Association Annual Survey data (2010-2021); Staffing Industry Analysts data (2020-22); Woods & Poole data (2010-21); and L.E.K. intellectual property

## Nursing shortage outlook (2023-27)

### RN 'demand' growth shows no sign of slowing

Post-pandemic, the historical drivers of demand for hospital RNs will persist. We expect the increased age and chronicity of the U.S. population, the transition to value-based care, and the move to outpatient treatment will continue through 2027. These factors make it likely that demand for hospital RNs will continue to grow according to historical rates — 2.0% to 2.5% annually, or roughly 40,000 to 55,000 additional FTEs per year through 2027.<sup>32</sup>

### Will RN 'supply' growth keep up?

In order to create a significant and crucial remedy to the current U.S. RN shortage, hospital RN "supply" (FTEs working in hospitals) growth would have to exceed 40,000 to 55,000 per year. Based on current expectations for entries into and exits from the nursing profession, achieving those numbers is highly unlikely.

**New nursing profession entrants: Still constrained by education capacity**

Given capacity constraints in nursing education absent new government policy impacting nurse education and/or immigration limitations, there is strong reason to believe that the number of RNs entering the profession will, at most, continue to grow at the modest historical rate (2.3% 2010-2022 CAGR). The additional risk that media coverage of nurse burnout and nurses' dissatisfaction with working conditions dissuades some from pursuing a nursing education was illustrated by the 1.4% decline in BSN enrollment from 2021 to 2022.<sup>33</sup>

So even if the historical trend (2.3% 2010-2022 CAGR) continued, it would yield 90,000 to 100,000 new hospital RN FTEs entering the profession each year from 2023 to 2027.

**Nursing profession exits: Pressure continues**

At the long-term exit rate of 2.7% (2010-2022),<sup>34</sup> annual exits would be roughly 50,000 to 55,000 FTEs, further widening the shortage.

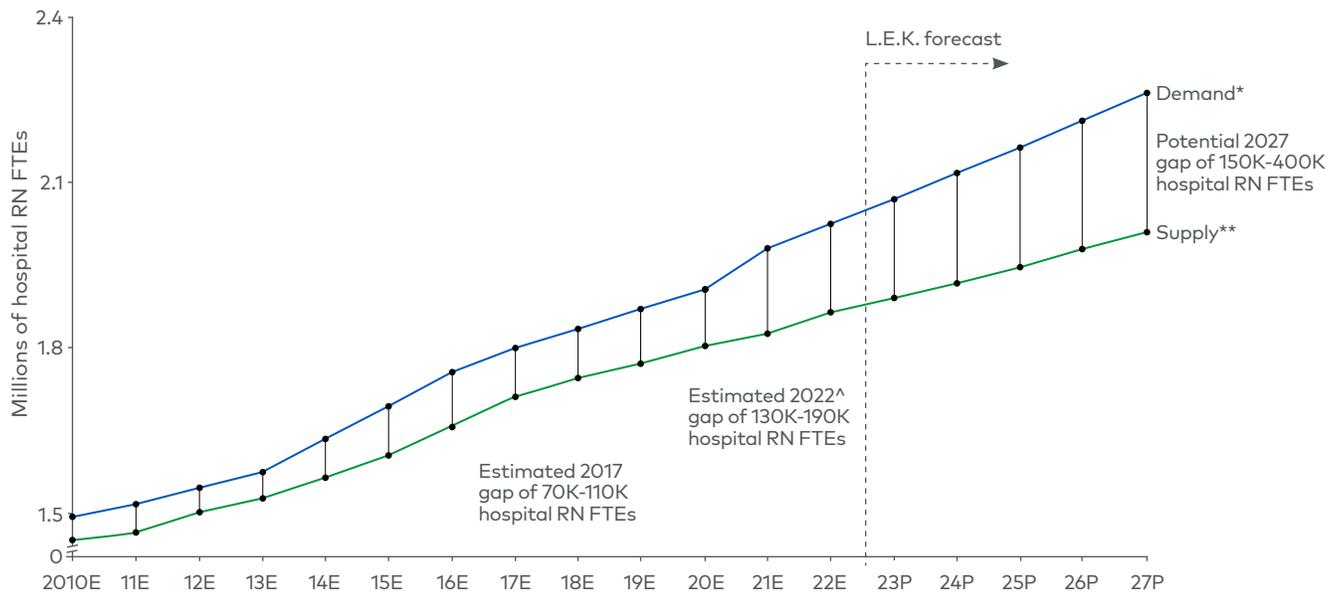
And little suggests that exit rates will slow in the future. In fact, there is reason to believe that exit rates could increase given the high levels of nurse burnout and aging of the nurse population. The National Council of State Boards of Nursing and the National Forum of State Nursing Workforce Centers 2022 National Nursing Workforce Survey showed that about 29% of the current RN workforce expects to retire or leave the profession over the next five years (i.e., 5.7% annually).<sup>35</sup> With a roughly 25% haircut on this estimate to account for survey overstatement, the rate would be 4.3%, or about 80,000 exits per year.

So how would the nurse shortage be affected through 2027 if all of the following occurred?

- Demand grew at 2.0%-2.5% annually (in line with historical growth)
- The number of first-time entrants to the nursing profession grew at 2.3% annually (in line with historical growth, despite early indicators this could decelerate)
- The annual exit rate for RNs was between 2.7% (in line with historical) and 4.3% (elevated given the survey data on intent to leave the profession)
- The proportion of RNs working in hospitals remained constant

The answer: The nurse shortage would likely grow, reaching a deficit of 150,000 to 400,000 FTEs in 2027 within hospitals alone (see Figure 4).

**Figure 4**  
Directional hospital RN shortage outlook (2023P-27P)



\*Demand line represents the average of the 2.0% and 2.5% annual growth scenarios

\*\*Supply line represents the average of the 2.7% and 4.3% exit rate scenarios

^2022 demand is projected because AHA hospital data that informs demand has not been released at time of publication

Note: RN=registered nurse; FTEs=full-time equivalents; E=estimated; P=projected

Source: L.E.K. analysis of Bureau of Labor Statistics data (2010-22); American Hospital Association Annual Survey data (2010-21); National Council of State Boards of Nursing data (2010-22); Staffing Industry Analysts data (2020-22); and L.E.K. intellectual property

## Implications: Ongoing nurse staffing roadblocks require a thoughtful approach from numerous stakeholders

As this challenge worsens, provider organizations, regulators, technology developers and staffing agencies must all commit to taking deliberate and strategic action to address this crisis. We offer the following recommendations:

- **Healthcare provider organizations** must develop and invest in strategies to recruit, retain and enable their nursing workforce by, for example, exploring new care delivery models, creating internal float pools and/or promoting schedule flexibility
- **Regulators** should consider how best to mitigate continued nurse supply constraints via a range of public policy avenues that could include subsidies to increase nurse education capacity, incentives for nurse educators and revised immigration policies to attract foreign-born nurses
- **Technology developers** should explore solutions, including those for workforce management and clinical efficiency, to extend the capabilities of the existing workforce most effectively while reducing the administrative burden on nurses
- **Staffing agencies** must continue to serve the important need of helping providers alleviate general, local and/or seasonal shortages, offering flexibility to nurses and critical support to healthcare providers and patients

The authors would like to thank Andrew Herbst for his important contribution to this *Executive Insights*.

Note: American Hospital Association data cited in this article comes from AHA's Annual Survey. The reporting period for a given year's survey varies across respondents and in some cases includes time from the prior calendar year. For example, in the 2021 survey (referenced as 2021 data in this article), among hospitals with noted reporting period start dates, reporting periods began in July 2020 for about 30%, October 2020 for about 15%, January 2021 for about 50% and some other date (most commonly in 2020) for about 5%. Staffing data is as of the end of the reporting period. Utilization data represents a 12-month period (actual or estimated). Data for staffing and utilization includes "all activities that are wholly owned by the hospital, including subsidiary corporations, regardless of where the activity is physically located." It does not include operations owned by a hospital's parent corporation.

L.E.K.'s Healthcare Services practice continues to work with healthcare organizations across a range of strategic issues. With our expertise, we can help healthcare provider organizations, regulators, technology developers and staffing agencies develop and implement strategies and solutions to address this challenge and improve the resiliency of the overall system and their businesses. If you or your organization is interested in discussing this topic with us, please reach out to us.

For more information, please contact [healthcare@lekinsights.com](mailto:healthcare@lekinsights.com).

## Endnotes

<sup>1</sup>L.E.K. analysis of American Hospital Association Annual Survey data (2010-2021). Vacancy is defined by the American Hospital Association (AHA) as a budgeted staff position that is unfilled as of the last day of the reporting period and for which the hospital is actively seeking either a full-time or part-time permanent replacement. Adjusted from headcount vacancies to full-time equivalent (FTE) vacancies using full-time and part-time hospital RN data from the AHA and grossed up for hospitals that do not report vacancies based on the share of FTE RNs out of the total that are from vacancy-reporting hospitals. AHA latest available Annual Survey data is from 2021, released end of year in 2022.

<sup>2</sup>The New York Times, "Where Have All the Nurses Gone?"  
<https://www.nytimes.com/1981/02/22/magazine/where-have-all-the-nurses-gone.html>

<sup>3</sup>RNs are inclusive of advanced practice registered nurses (APRNs) throughout this article.

<sup>4</sup>L.E.K. analysis of American Hospital Association Annual Survey data (2010-2021), Staffing Industry Analysts data (2020-22), Woods & Poole data (2010-21) and L.E.K. intellectual property (IP). Includes both staff and estimated travel nurse FTEs working at hospitals.

<sup>5</sup>L.E.K. analysis of Woods & Poole population data.

<sup>6</sup>2021 is the latest year of data availability.

<sup>7</sup>Health Resources & Services Administration, "Workforce Projections: Registered Nurses."  
<https://data.hrsa.gov/topics/health-workforce/workforce-projections>

<sup>8</sup>L.E.K. analysis of Woods & Poole population data.

<sup>9</sup>American Hospital Association, "Health for Life: Focus on Wellness."  
[https://www.aha.org/system/files/content/00-10/071204\\_H4L\\_FocusonWellness.pdf](https://www.aha.org/system/files/content/00-10/071204_H4L_FocusonWellness.pdf)

<sup>10</sup>Constant 2012 U.S. dollars using price indices provided by the National Health Expenditures Accounts; L.E.K. research and analysis on National Health Expenditure data (2010-19).  
<https://www.cms.gov/research-statistics-data-and-systems/statistics-trends-and-reports/nationalhealthexpenddata>

<sup>11</sup>L.E.K. analysis of American Hospital Association Annual Survey data (2010-21).

<sup>12</sup>L.E.K. analysis of American Hospital Association Annual Survey data (2010-21).

<sup>13</sup>2013 is the earliest year that the Centers for Medicare & Medicaid Services (CMS) published this data and includes data from Inpatient Prospective Payment System hospitals; L.E.K. analysis of CMS Medicare Inpatient Hospitals – by Geography and Service 2013-19 <https://data.cms.gov/provider-summary-by-type-of-service/medicare-inpatient-hospitals/medicare-inpatient-hospitals-by-geography-and-service/data>

<sup>14</sup>L.E.K. IP (research, interviews and analysis).

<sup>15</sup>L.E.K. analysis of American Hospital Association Annual Survey data (2010-2020).

<sup>16</sup>Current Opinion in Critical Care, "Surging ICU during COVID-19 pandemic: an overview." <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9612411/>

<sup>17</sup>L.E.K. analysis of American Hospital Association Annual Survey data (2010-2021).

<sup>18</sup>L.E.K. analysis of Bureau of Labor Statistics data 2010-19. <https://www.bls.gov/oes/tables.htm>

<sup>19</sup>Includes estimated hospital travel nurse FTEs; L.E.K. research of American Hospital Association Annual Survey data (2010-19), Bureau of Labor Statistics data (2010-19), National Council of State Boards of Nursing (NCBSN) NCLEX data (2010-19), L.E.K. IP.

<sup>20</sup>L.E.K. analysis of NCBSN 2010-22 NCLEX data. <https://www.ncsbn.org/exams/exam-statistics-and-publications/nclex-fact-sheet.page>

<sup>21</sup>American Association of Colleges of Nursing, "Nursing Faculty Shortage Fact Sheet." <https://www.aacnursing.org/news-data/fact-sheets/nursing-faculty-shortage>

<sup>22</sup>American Association of Colleges of Nursing, "New Data Show Enrollment Declines in Schools of Nursing, Raising Concerns About the Nation's Nursing Workforce." <https://www.aacnursing.org/news-data/all-news/article/new-data-show-enrollment-declines-in-schools-of-nursing-raising-concerns-about-the-nations-nursing-workforce>

<sup>23</sup>Definition of exit rate (in headcount) throughout this article: (Change in total RN population minus NCLEX passers assumed to enter the workforce) / (Prior year total RN population). Implicitly, temporary exits for school or other reasons are not included in the exit rate because they are not included in the entrance rate.

<sup>24</sup>American Nurses Foundation, "Mental Health and Wellness Survey 3." <https://www.nursingworld.org/practice-policy/work-environment/health-safety/disaster-preparedness/coronavirus/what-you-need-to-know/pulse-on-the-nations-nurses-covid-19-survey-series-mental-health-and-wellness-survey-3-september-2021/>

<sup>25</sup>L.E.K. analysis of American Hospital Association Annual Survey data (2010-2021). Statistic excludes estimated travel nurses working at hospitals.

<sup>26</sup>L.E.K. analysis of American Hospital Association Annual Survey data (2010-2021).

<sup>27</sup>American Association of Colleges of Nursing, "New Data Show Enrollment Declines in Schools of Nursing, Raising Concerns About the Nation's Nursing Workforce." <https://www.aacnursing.org/news-data/all-news/article/new-data-show-enrollment-declines-in-schools-of-nursing-raising-concerns-about-the-nations-nursing-workforce>

<sup>28</sup>Available data on travel nurse market do not separate RNs from other types of nurses. It was assumed for this analysis that all travel nurses were RNs.

<sup>29</sup>Staffing Industry Analysts, "Travel Nurse: Staffing Word of the Week." <https://www2.staffingindustry.com/Editorial/Daily-News/Travel-nurse-Staffing-Word-of-the-Week-63438>

<sup>30</sup>L.E.K. analysis of Bureau of Labor Statistics data (2014-19), Staffing Industry Analysts data (2020-22) and L.E.K. IP.

<sup>31</sup>Healthcare Dive, "Travel nurse pay remains high as hospitals fill gaps from staff departures." <https://www.healthcaredive.com/news/travel-nurse-pay-high-hospitals-staffing/637412/>

<sup>32</sup>L.E.K. modeled two scenarios for demand growth. In both scenarios, 2021 is the latest year of actual data from the American Hospital Association. In scenario 1, 2021 demand was grown by 2.0% annually through 2027, based on historical CAGRs from 2010 to 2013 and 2016 to 2019. The years 2013-16 were excluded because these years saw elevated demand growth that did not continue in 2016-19. In scenario 2, 2021 demand was grown by 2.5% annually through 2027 using the 2.5% 2010-19 CAGR.

<sup>33</sup>American Association of Colleges of Nursing, "New Data Show Enrollment Declines in Schools of Nursing, Raising Concerns About the Nation's Nursing Workforce." <https://www.aacnursing.org/news-data/all-news/article/new-data-show-enrollment-declines-in-schools-of-nursing-raising-concerns-about-the-nations-nursing-workforce>

<sup>34</sup>L.E.K. analysis of Bureau of Labor Statistics data (2010-2022), American Hospital Association Annual Survey data (2010-2021), National Council of State Boards of Nursing data (2010-2022), Staffing Industry Analysts data (2020-22) and L.E.K. IP.

<sup>35</sup>Journal of Nursing Regulation, "The 2022 National Nursing Workforce Survey." [https://www.journalofnursingregulation.com/article/S2155-8256\(23\)00047-9/pdf](https://www.journalofnursingregulation.com/article/S2155-8256(23)00047-9/pdf)

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