WHO'S AT THE BEDSIDE? DOES VIRGINIA HAVE ENOUGH NURSES?

"Save one life, you're a hero. Save 100 lives, you're a nurse."

– Unknown

Nursing is a critical profession within the health care sector focused on the care of individuals, families, and communities for an ideal quality of life. The nursing field is composed of many specialties, and nurses take on the critical duties of patient education, needs assessment, patient care, and many other types of health care support. It was no surprise that nursing was rated as the most trusted profession in the latest Gallup poll of honesty and ethics.[1] In fact, nursing has been among the most trusted professions, if not the most trusted profession, since Gallup first asked Americans the question.

In the 2021 Gallup poll, 81% of respondents viewed nurses as having "very high/high" honesty and ethics, a full 14 percentage points over the next highest profession, medical doctors, and 76 percentage points over the lowest ranked profession, lobbyists. Yet even though many Americans believe nurses are to be trusted and have high ethical standards, the profession has been the target of disinformation during the COVID-19 pandemic. Social media is awash with conspiracy theories that nurses, along with doctors, are mistreating COVID-19 patients, resulting in long-term injury and death.

1 Lydia Saad, "Military Brass, Judges Among Professions at New Image Lows," Gallup, January 12, 2022. https://news.gallup.com/poll/388649/military-brass-judges-among-professions-new-image-lows.aspx

A 2020 study across 173 countries found that health care workers were more likely to experience stigma and bullying from working with COVID-19 patients than from individuals outside of health care settings.[2] As disinformation rises, many nurses feel under attack, with too many patients to care for, too many demands on the profession, and not enough support from a system that would grind to a halt without their efforts. The onset of the COVID-19 pandemic appears to have only intensified these outbreaks of verbal and physical abuse. In October 2021, a patient at Riverside Regional Medical Center in Newport News was arrested and charged with malicious assault, assault, shoot/stab in the commission of a felony, and battery on a health care provider in connection with an attack on an Emergency Department nurse.[3] Karen Mitchell, chief nursing officer at the Children's Hospital of The King's Daughters in Norfolk, noted that nurse resignations and transfers increased as the pandemic wore on. "At the beginning of the pandemic, a lot of nurses didn't leave their jobs because of the uncertainty. ... We feel these increases in resignations and transfers are due to a backlog from mid-2020. ... Stress, burnout; it's challenged the typical resiliency we've had in the past."[4]

The prevalence of aggression against nurses is, unfortunately, nothing new. In 2020, there were 78,740 cases of nonfatal workplace injuries and illnesses that resulted in at least one day away from work among registered nurses employed by private industry. Presented in Graph 1, this was a 291% increase, about four times as many cases as recorded in 2019. The shocking impact of COVID to the work environment can also be seen in the meteoric rise of days away from work due to harmful exposure, from 660 in 2019 to 55,750 days out in 2020. The impact of a lack of personal protection equipment will be discussed later in the chapter.

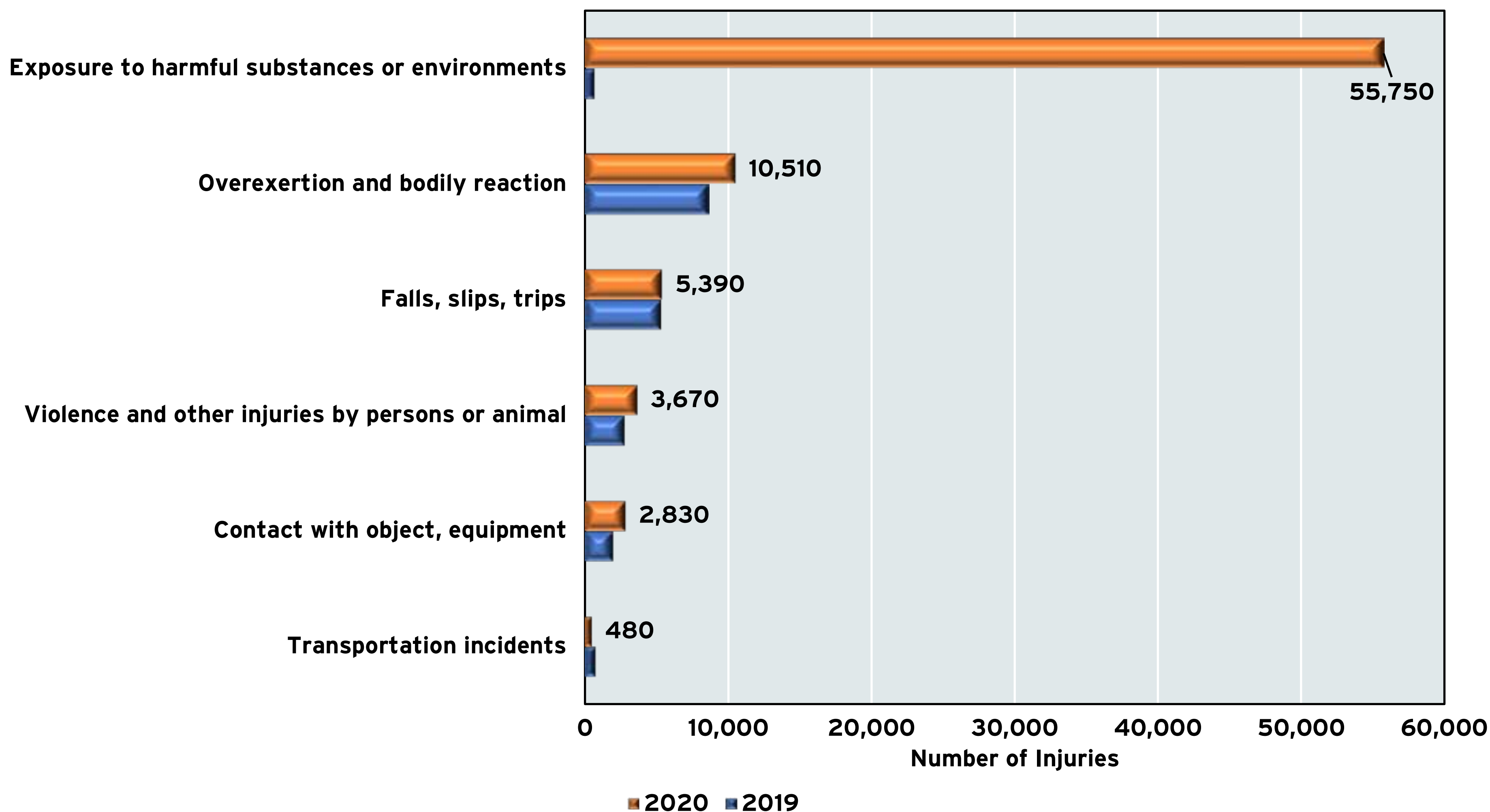
As nursing shortages increase across the state and nation, the competition for existing nurses and new graduates will only intensify. The Commonwealth of Virginia is likely to see the rise of "nurse deserts" where some rural areas across the state may not have immediate access to a registered nurse. Without sufficient access to health care, the urban-rural divide will only increase, further exacerbating health care inequalities in Virginia.

In this chapter, we examine the role of registered nurses in the Commonwealth and ask how demands on the profession have changed over time. We then examine whether there is a nursing shortage in the Commonwealth and the United States. We discuss nurses' education levels in Virginia and what barriers prevent more nurses from entering the state workforce. We conclude with thoughts on the role and prospects for the nursing profession in Virginia.

2 Dye TD, Alcantara L, Siddiqi S, et al. "Risk of COVID-19-related bullying, harassment and stigma among health care workers: an analytical cross-sectional global study." BMJ Open 2020 (10):e046620. Available at: doi:10.1136/bmjopen-2020-046620
3 https://www.13newsnow.com/article/news/local/mycity/newport-news/police-investigate-stabbing-by-riverside-regional-medical-center-newport-news/291-e76a4418-83b8-4614-a335-99c7a4b4ef2c
4 https://www.13newsnow.com/article/news/health/stress-burnout-national-nursing-shortage-impacting-virginia/291-71ff0f4c-6f73-4f1e-b9c0-01b8af2706f6

GRAPH 1

NUMBER OF NONFATAL RN WORKPLACE INJURIES AND ILLNESSES RESULTING IN DAYS AWAY FROM WORK, BY SELECTED EVENTS, PRIVATE INDUSTRY, 2019 AND 2020



Source: Bureau of Labor Statistics, May 6, 2022, https://www.bls.gov/opub/ted/2022/nonfatal-injuries-and-illnesses-resulting-in-days-off-work-among-nurses-up-291-percent-in-2020.htm

Registered Nurses: A Primer

The history of modern professional nursing traditionally begins in the mid-19th century with Florence Nightingale, the daughter of wealthy British parents, who challenged social conventions and became a nurse. At that time, providing health care to citizens either in hospitals or in their homes was not viewed as a respectable career for the affluent. However, Nightingale, who organized women to care for soldiers during the Crimean War, believed that well-educated women, using scientific principles and information about health and well-being, could dramatically improve health outcomes of the sick and injured. She also believed that nursing provided women an avenue for intellectual and social freedom. Nightingale's influence on her patients' health and well-being established many of today's nursing care models. Today, the nursing profession spans from certified nursing assistants to licensed practical nurses, and registered nurses to non-bedside nursing jobs in business, education, or research.

Registered nurses (RNs), however, both men and women, are among the most highly educated and respected members of the health care delivery team. With about 4 million nurses across all fields, nursing is the largest of the health professions in the United States. Registered nurses' roles continue to change and expand with the demands of an increasingly complex health care industry, advanced education in nursing, greater patient longevity, and advancements in health care and technology.

According to the International Council of Nurses (ICN), the scope of nursing practice "encompasses autonomous and collaborative care of individuals of all ages, families, groups, and communities, sick or well and in all settings." As clinicians, RNs develop and implement individual plans of care, monitor and record patients' health care needs and changing physiological conditions, administer, monitor the effects of, and at times prescribe medications and treatments, educate patients on self-care and the prevention of illness, conduct health screening tests and procedures, and supervise other nursing personnel.

Registered nurses with additional education and training can specialize as advanced practice nurses. There are four types of advanced practice nurses in the U.S.: nurse practitioners, nurse midwives, clinical nurse specialists, and nurse anesthetists. RNs can also work as educators, administrators, executives, consultants, and researchers.

According to the Bureau of Labor Statistics, there were approximately 3 million RNs in the United States in May 2021. Other jobs in the nursing profession, such as certified nursing assistants (CNAs) and licensed practical nurses (LPNs) offer support in patient care. CNAs provide basic care to patients and help them with daily activities they might have trouble doing on their own, such as bathing and getting dressed. LPNs, who provide higher level care than CNAs, may assist RNs and physicians. Graph 2 depicts the median annual wage for RNs, LPNs, and CNAs in the United States in 2021.

In 2008, the Robert Wood Johnson Foundation (RWJF) and the Institute of Medicine (IOM) launched a two-year initiative to assess and transform the nursing profession. As a result, in 2011 the IOM released the report *The Future of Nursing: Leading Change, Advancing Health,* which recommended that nurses: 1) practice to the full extent of their education, training, and licensure; 2) achieve higher levels of education and training through an improved educational system that promotes seamless academic progression; and 3) become full partners, with physicians and other health professionals, in redesigning health care in the U.S.

There are essentially three traditional degree pathways to becoming a registered nurse: associate, bachelor's, and nursing diploma programs. Nursing diploma programs differ from the more traditional college or university-based associate and bachelor's degree programs in that they are typically run by (or in close conjunction with) hospital systems, lasting one to three years, to prepare students for licensure as a registered nurse. Graph 3 displays the number of postsecondary awards in the United States from 2009 to 2019. What immediately stands out is that while the number of associate degrees has remained relatively constant over this period, the number of other degrees has increased significantly. Bachelor's, master's, and doctoral degree awards increased by 101.1%, 153.4%, and 462.5%, respectively, from 2009 to 2019. In our conversations with nurses,

these shifts can be partly explained by the preference of employers to hire nurses with four-year (or higher) degrees and the need for continuing education among the existing nursing workforce. Research has also highlighted the quality and safety educational gaps between associate and bachelor's nursing graduates, a factor that may influence the demand for bachelor's programs among higher quality students over time.[5]

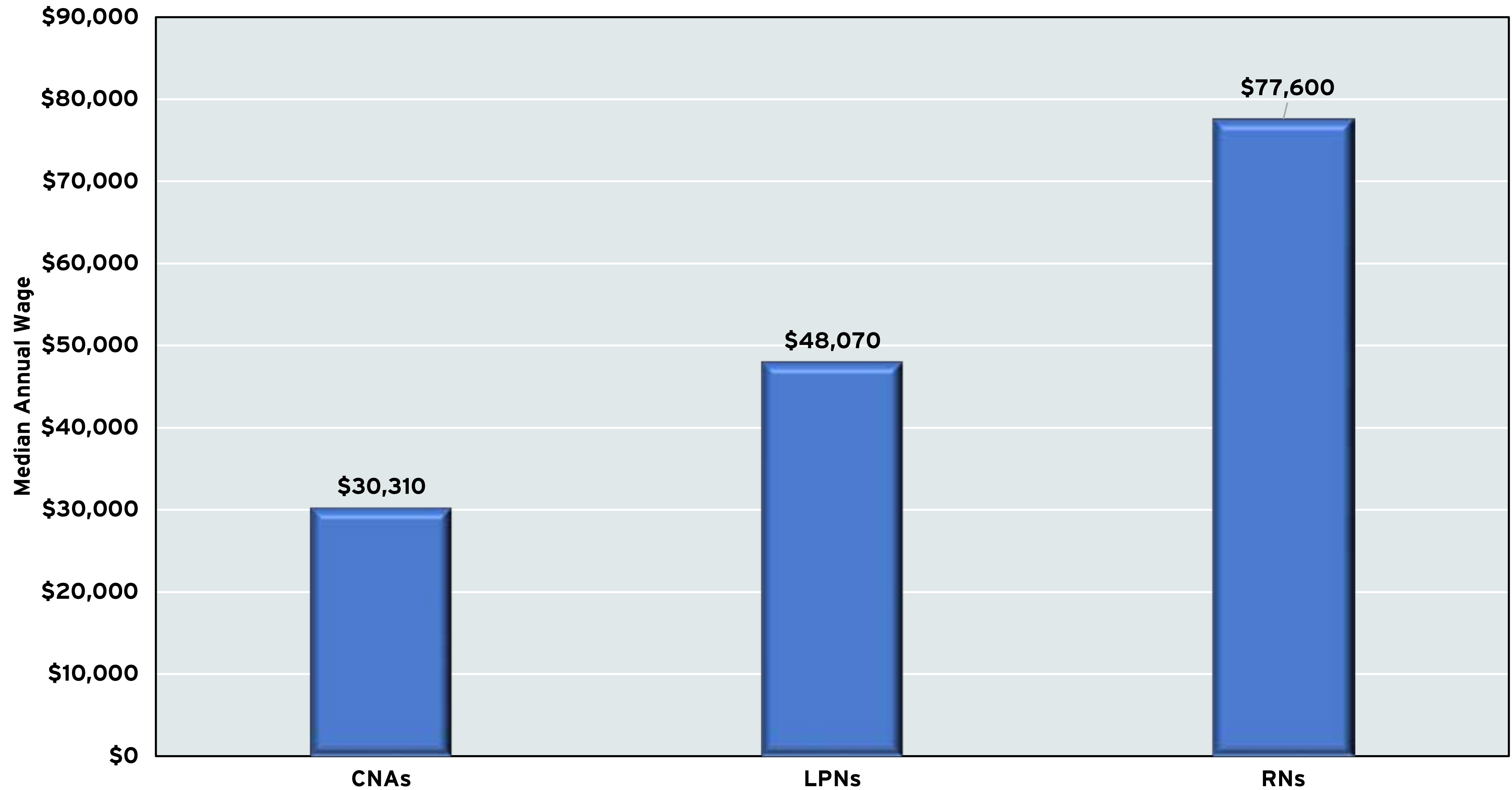
Graph 4 displays nursing awards in Virginia from 2009 to 2019. First, the number of bachelor's degrees awarded to students, 1,681 in the 2009–2010 academic year (AY) increased to 2,915 in the 2019–2020 AY. The number of associate degrees also increased from 1,726 in the 2009–2010 AY to 2,560 in the 2019–2020 AY.

In 2021, according to the Virginia Department of Health Professions, there were 81 registered nursing programs in the Commonwealth. Thirty-eight of these programs awarded an associate degree and 30 awarded a bachelor's degree. Eleven programs offered an accelerated baccalaureate and master's degree. Two programs were online and allowed students to earn an associate or bachelor's degree. Thirty-six of the 81 programs in Virginia also offered a Registered Nurse–Bachelor of Science (RN-BSN) pathway. Virginia does not appear to lack nursing programs, with multiple institutions offering degrees ranging from associate to doctoral degrees. In Table 1, we present data for several of the largest nursing programs in the Commonwealth. However, as we discuss later in the chapter, the supply chain of new nurses faces critical bottlenecks that limit the Commonwealth's ability to increase supply in the near term.

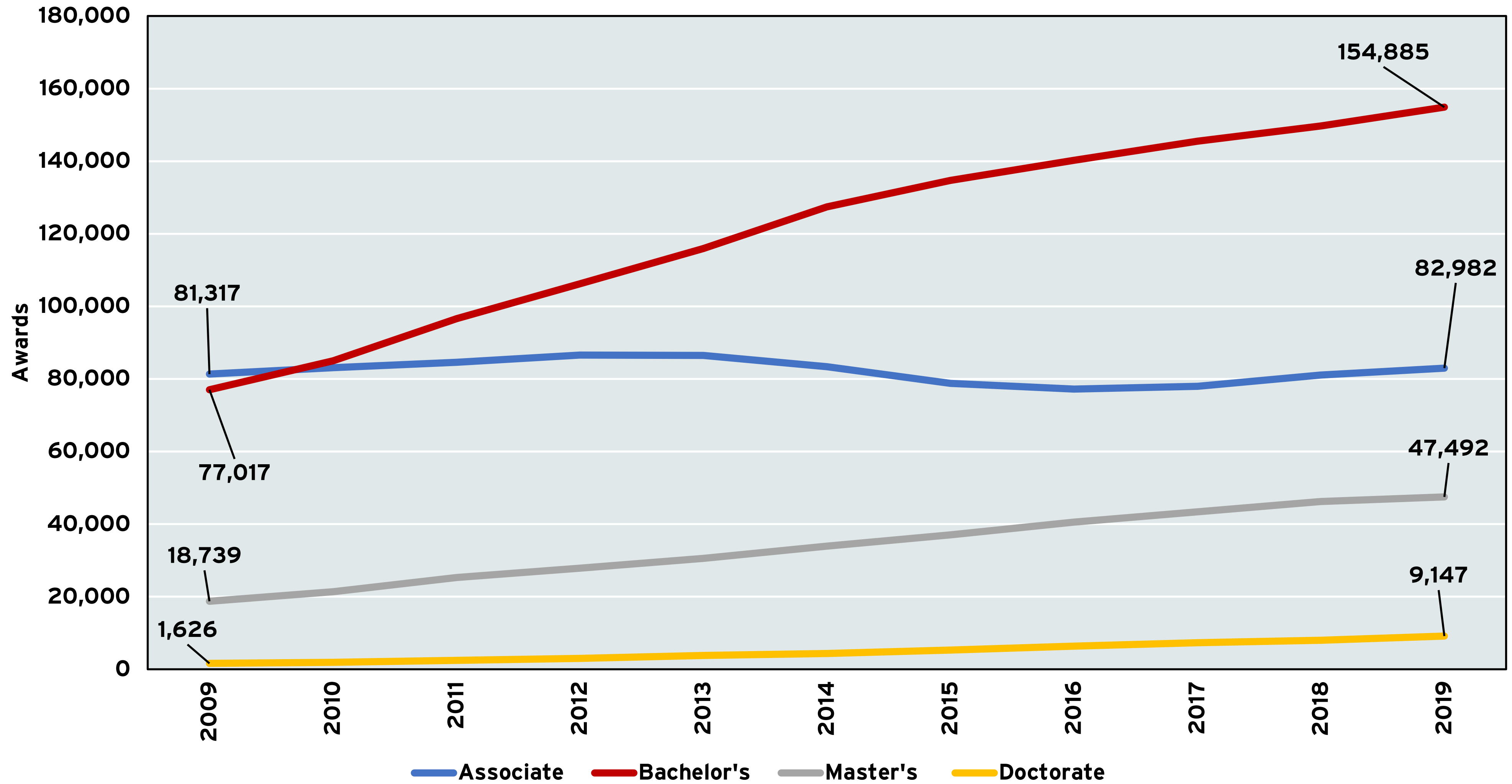
5 Maja Djukic, Amy Witkoski Stimpfel, Christine Kovner. (2019). "Bachelor's Degree Nurse Graduates Report Better Quality and Safety Educational Preparedness than Associate Degree Graduates." *The Joint Commission Journal on Quality and Patient Safety*, Volume 45, Issue 3, 180-186, https://doi.org/10.1016/j.jcjq.2018.08.008.

GRAPH 2

**MEDIAN ANNUAL WAGE FOR NURSING PROFESSIONS
UNITED STATES, 2021**



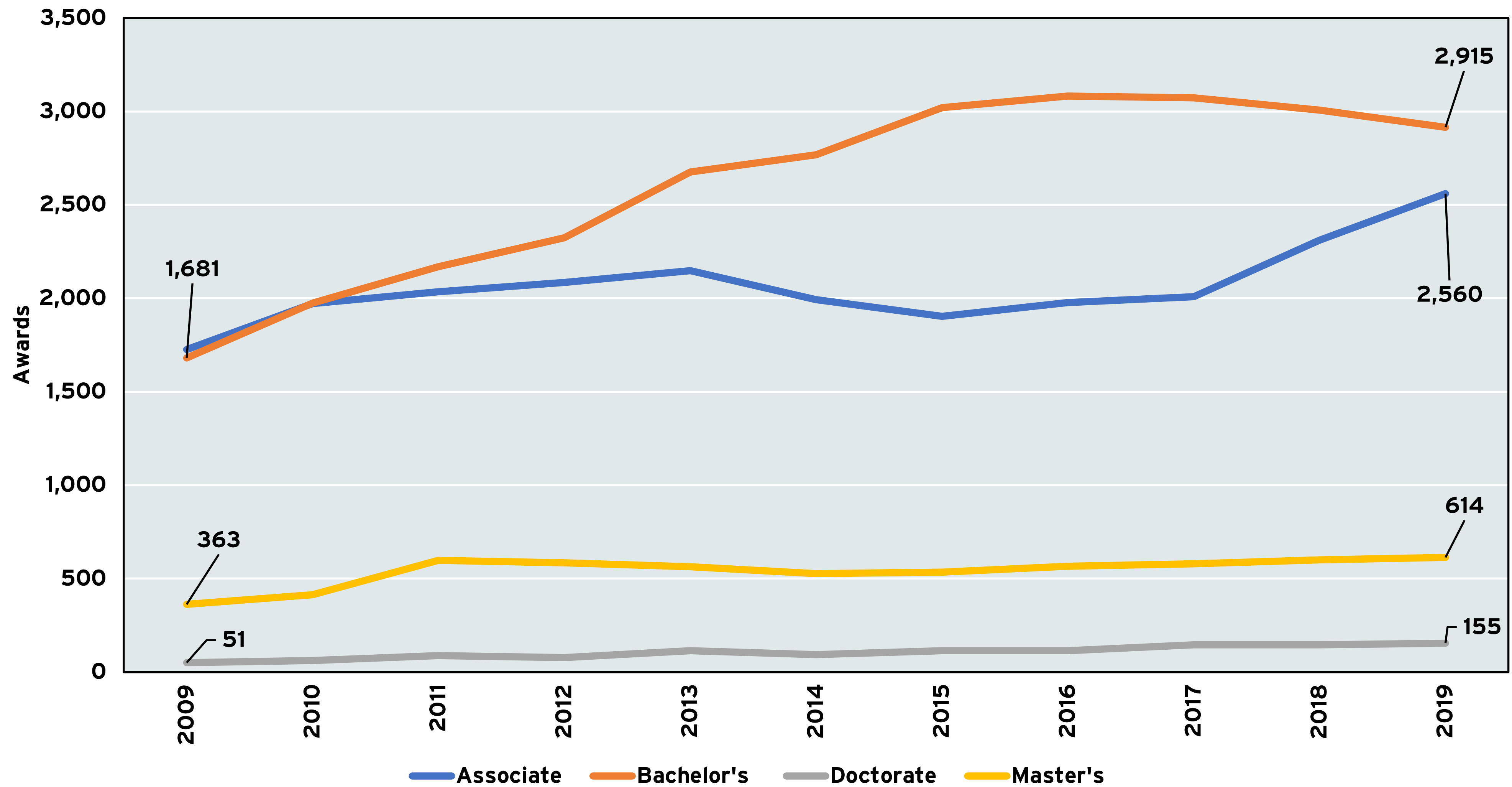
Source: Bureau of Labor Statistics, Occupational Employment and Wage Statistics (OEWS), May 2021.



Source: IPEDS Awards by 6-digit CIP code. Reflects awards for 17 post-secondary degree programs linked to the Registered Nursing Occupation as defined by the National Center for Education Statistics (NCES) and Bureau of Labor Statistics (BLS) CIP-SOC Crosswalk. Years reflect academic years, that is, 2009 is the 2009 – 2010 academic year.

GRAPH 4

**AWARDS IN POSTSECONDARY PROGRAMS FOR REGISTERED NURSING
VIRGINIA INSTITUTIONS
ACADEMIC YEARS 2009-10 TO 2019-20**



Source: IPEDS Awards by 6-digit CIP code. Reflects awards for 17 postsecondary degree programs linked to the Registered Nursing Occupation as defined by the National Center for Education Statistics (NCES) and Bureau of Labor Statistics (BLS) CIP-SOC Crosswalk.

TABLE 1

LARGEST REGISTERED NURSING PROGRAMS, SELECTED INSTITUTIONS, VIRGINIA, 2019-2020 ACADEMIC YEAR

	Associate	Bachelor's	Postbaccalaureate Degrees*
ECPI University	504	152	18
Liberty University	-	369	161
Virginia Commonwealth University	-	216	112
James Madison University	-	252	40
Old Dominion University	-	196	92
George Mason University	-	167	100
University of Virginia-Main Campus	-	100	159
Radford University	-	219	36
Bryant & Stratton College-Virginia Beach	196	1	-
Rappahannock Community College	97	-	-

Source: Dragas Center for Economic Analysis and Policy (2022) and Integrated Postsecondary Education System (IPEDS). Top 10 institutions estimated as the largest awards by type for CIP codes linked to the registered nursing occupation (29-1141). *Post-baccalaureate degrees include post-baccalaureate or post-master's certificate, master's and doctoral degrees.

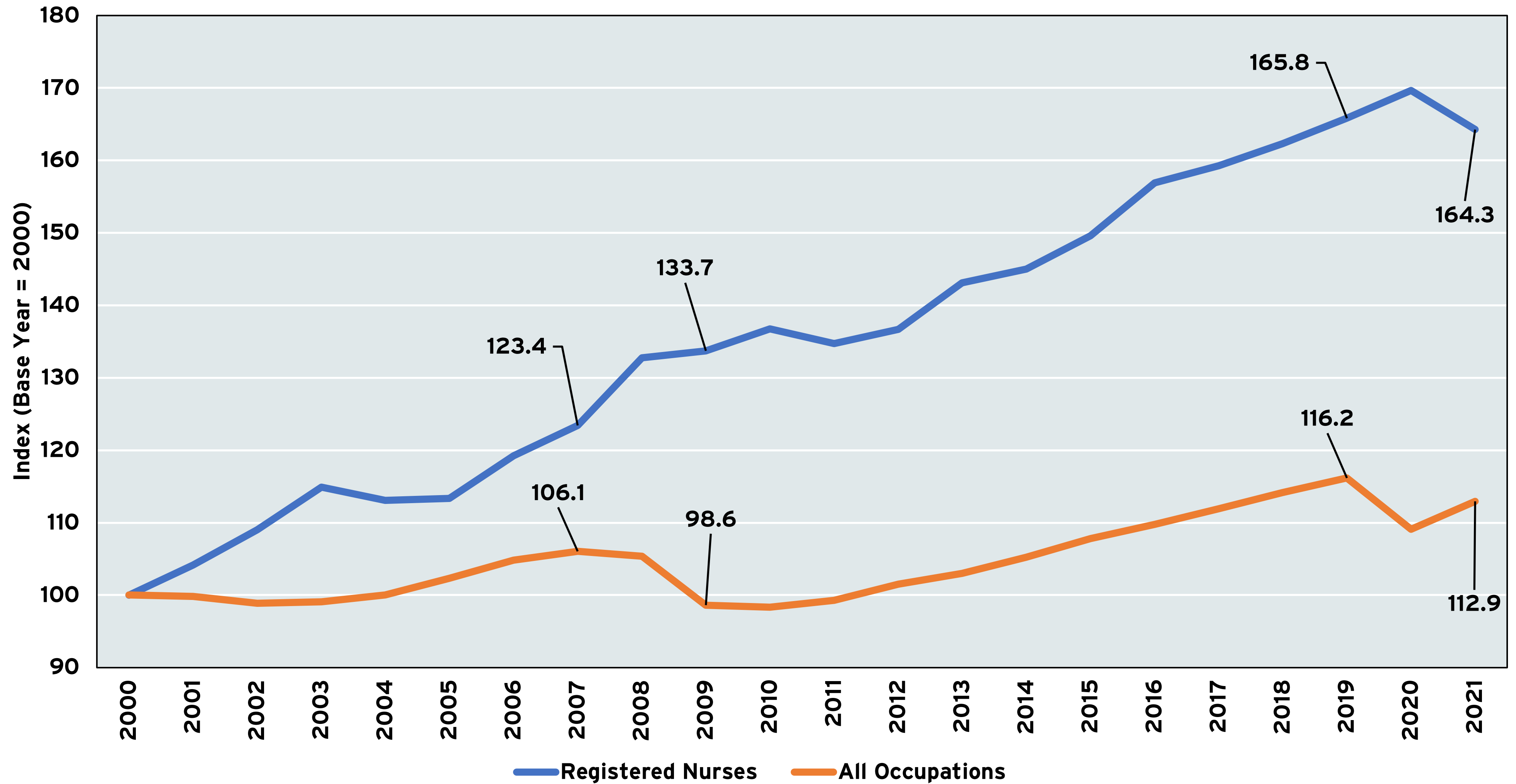
Before COVID: A Younger Profession in Demand

Even before the COVID-19 pandemic increased the strain on the health care system in the United States, registered nurses were in high demand. Graph 5 compares the employment growth of RNs and all occupations in the United States from 2000 to 2021. A familiar story emerges with an increase in overall employment prior to the Great Recession of 2007 to 2009. In the aftermath of the Great Recession, full-time employment declined by 7.3% in 2010. From this trough, the longest peacetime economic expansion would occur, as full-time employment rose by 18.1% from 2010 to 2019. There were 16.2% more full-time wage and salary workers in 2019 than 2000, and full-time employment was 9.5% higher than the previous pre-recessionary peak.

For RNs, on the other hand, employment surged over the past two decades. From 2000 to 2007, employment grew by 23.4% and increased another 10.8 percentage points during the Great Recession. RN employment continued to grow over the previous decade, and by 2019, there were 65.8% more employed nurses than there were in 2000. As the employment of nurses increased, it should be no surprise that nurses have gotten younger, on average, over time. Graph 6 shows the median age of registered nurses and all workers in the United States from 2011 to 2019. Over this period, the median age of registered nurses in the United States declined from 44.7 years to 43 years while the median age of all workers increased from 42.1 years to 42.3 years.

GRAPH 5

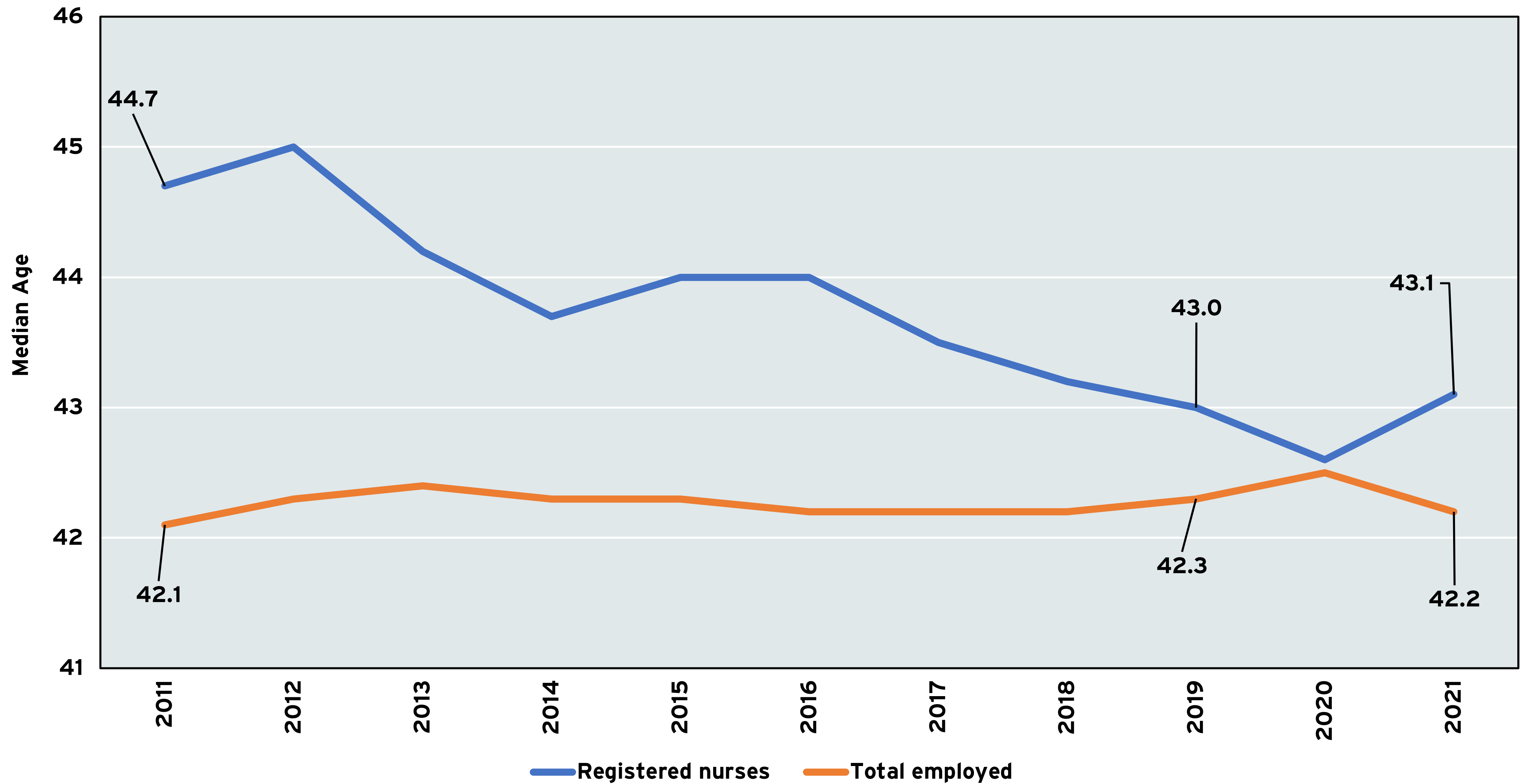
**EMPLOYMENT GROWTH OF FULL-TIME WAGE AND SALARY WORKERS
REGISTERED NURSES AND ALL OCCUPATIONS
UNITED STATES, 2000 - 2021**



Source: U.S. Bureau of Labor Statistics, employed full time: Wage and salary workers: Registered nurses occupations: 16 years and over [LEU0254487900A], retrieved from FRED. Non-seasonally adjusted data.

GRAPH 6

MEDIAN AGE OF WORKERS
REGISTERED NURSES AND ALL OCCUPATIONS
UNITED STATES, 2011 - 2021



Source: U.S. Bureau of Labor Statistics, Current Population Survey (CPS). Table 11b. Employed persons by detailed occupation and age.

Stress, Overwork, and Burnout: The Impact of COVID-19

Limited empirical data are currently available about the impact of COVID-19 on the nursing workforce in Virginia. Anecdotally, the COVID-19 pandemic has had a significant and long-lasting impact on the supply of nurses and demand for nursing services across the Commonwealth and nationwide. We can start by identifying nurse burnout as a human condition that results from excessive and prolonged emotional, physical, and mental stress points, leaving nurses feeling depleted, exhausted and, at times, traumatized.

Between March of 2020 and March of 2022, an already overtaxed nursing workforce was asked to do a whole lot more; one study estimated that COVID-19 hospital staffing demands increased by 245%, or 50,000 nurses' worth, from September 2020 to December 2020.[6] As a result, hospital systems in Virginia reported nurses moving to non-bedside jobs or leaving the profession altogether.

In an equal but opposite scenario, nearly 100,000 registered nurses nationwide found themselves unemployed through furloughs or terminations because non-COVID staffing needs in areas such as elective surgeries, procedures, and other health care operations were down. This resulted in many nurses experiencing financial and emotional distress, for perhaps the first time ever, given the otherwise recession-proof nature of the job. In the Commonwealth, RNs are slightly less likely to be employed in the profession today than they were in 2016 (89% vs. 90%) and only 1% of licensees report being involuntarily unemployed, likely because of the coronavirus pandemic.[7] Even with COVID-19 cases decreasing in 2022, there are reports now of chronic burnout and persistent understaffing in some areas.

The lack of adequate personal protection equipment (PPE) throughout the pandemic had an adverse impact on nurses. These basic and routinely scarce items included masks, face shields, hand sanitizer, sneeze guards, and disinfecting wipes. Nurses reported feeling betrayed by management who they felt did not prioritize their safety.[8] The unavailability of basic PPE during the onset of the pandemic and beyond caused some nurses to resign, retire, or leave the profession, which exacerbated workforce shortages across the nation.[9] Get us PPE[10] is a 501(c)(3) nonprofit organization that emerged during the pandemic in March 2020 to assist health care professionals in obtaining scarce protective gear. The agency reports that from March 20, 2020, to July 2, 2021, 23,001 total individual requests for PPE were received and over 17 million pieces of PPE were delivered at no cost to frontline workers in the United States. Get Us PPE listed N95 masks as the No. 1 requested item from the Commonwealth of Virginia. In 2020 and 2021, the organization delivered 33,660 pieces of PPE to Virginia, with gowns being the top delivered protective gear. Although large hospital systems were more likely to purchase PPE directly from suppliers, Get Us PPE met the dire need for PPE in under-resourced facilities such as nursing homes, Title I schools, and clinics. The organization stopped registering requests for donated PPE and coordinating PPE deliveries after July 2, 2021. Get Us PPE is now focused on advocating for the creation of a national PPE clearinghouse to solve supply issues for small and underserved communities as well as for the prevention of counterfeit PPE and price gouging.

While limited data are currently available on the exact number of nurses in Virginia who suffer ongoing health issues or have died from COVID-19, it is estimated that thousands of nurses nationwide suffer ongoing adverse effects after caring for COVID-19 patients.[11] Through their Lost on the

6 Teriakidis,A., McNitt, J., McAllister, M., Sizemore, O., Lindemann, P. (January 5, 2021). "COVID-19 Impact on Nurse Staffing and ICU Beds." Epic Research, https://epicresearch.org/articles/covid-19-impact-on-nurse-staffing-and-icu-beds

7 Department of Health Professions.

8 8 Arnetz JE, Goetz CM, Sudan S, Arble E, Janisse J, Arnetz BB. "Personal Protective Equipment and Mental Health Symptoms Among Nurses During the COVID-19 Pandemic." J Occup Environ Med. 2020 Nov;62(11):892-897. doi: 10.1097/JOM.0000000000001999. PMID: 32804747.

9 Chan, G.K., Bitton, J.R., Allgeyer, R.L., Elliott, D., Hudson, L.R., Moulton Burwell, P., (May 31, 2021). "The Impact of COVID-19 on the Nursing Workforce: A National Overview" OJIN: The Online Journal of Issues in Nursing Vol. 26, No. 2, Manuscript 2.

10 For more information, visit https://getusppe.org/data/

11 "The Toll of COVID-19 on Health Care Workers Remains Unknown." AJN, American Journal of Nursing: March 2021 Volume 121 - Issue 3 - p 14-15 doi: 10.1097/01.NAJ.0000737240.67253.9e

Frontline project, which aims to document the life of every U.S. medical worker who dies from COVID-19 after helping patients during the outbreak, The Guardian and Kaiser Health Network estimates that nurses comprise 32% of all health care worker deaths due to COVID-19.[12]

Are Registered Nurses Leaving the Profession?

Even though we are two-plus years into the COVID-19 pandemic, quantifying the impacts on registered nurses remains a story in progress. In Graph 7, we examine the growth in RNs in the United States. In 2018 and 2019, the number of full-time RNs increased by 1.9% and 2.2%, respectively. In 2020, not surprisingly, employment grew by another 2.3%. However, in 2021, the number of employed full-time RNs in the United States fell by 3.2% even while full-time employment for all occupations increased by 3.5%.

One possibility is that the demand for health care workers (and by extension, registered nurses) declined as the pandemic grinded into its second year. However, as Graph 8 illustrates, the demand for health care workers continued to outstrip the supply of available workers. In 2019, the gap between job openings and hires averaged about 560,000 a month. In 2020, this gap declined to approximately 410,000 as attempts to contain the pandemic led to reductions (if not outright stoppages) in elective medical procedures. However, in 2021, the average gap between job openings and hires widened to 947,000 a month and jumped again to approximately 1.2 million in 2022. There does not appear to be much support for the argument that the demand for health care workers has fallen over time.

Another possibility is that registered nurses are quitting faster than they can be hired. The data are, again, somewhat limited, but we can examine the age distribution of registered nurses to gain insight into this question (Graph 9). In 2021, the proportion of nurses in the youngest age group, 25 years to 34 years, declined a full percentage point to 25.7%. Likewise, the percentage of nurses in the next age group, 35 to 44 years, declined as well, from 25.6% in 2020 to 24.1% in 2021. On the other hand, in the same year, the proportion of nurses in the 45 to 54 age group increased by one percentage point, from 21.1% in 2020 to 22.2%. While one year does not make a trend, it may be a signal that younger registered nurses are leaving the profession. The decline in the median age of the profession (observed in Graph 6) may halt and reverse if this becomes a full-fledged flight by the youngest members of the profession. Without a steady influx of new registered nurses, the stresses on existing RNs will only increase over time.

Looking to the future, the demand for registered nurses is likely to outpace supply. Over the next decade, the average difference between the increase in the supply of nurses and the increase in demand for nurses in the United States will exceed 20,000 a year (Table 2). In other words, on average, there will be more than 20,000 unfilled RN positions a year because there will not be sufficient entrants into the nursing profession. We caution that these projections do not account for the toll that COVID-19 has taken on the profession. If anything, these workforce gap estimates may be optimistic.

TABLE 2

POTENTIAL AVERAGE ANNUAL OCCUPATION GAPS FOR REGISTERED NURSES UNITED STATES, 2022-2032

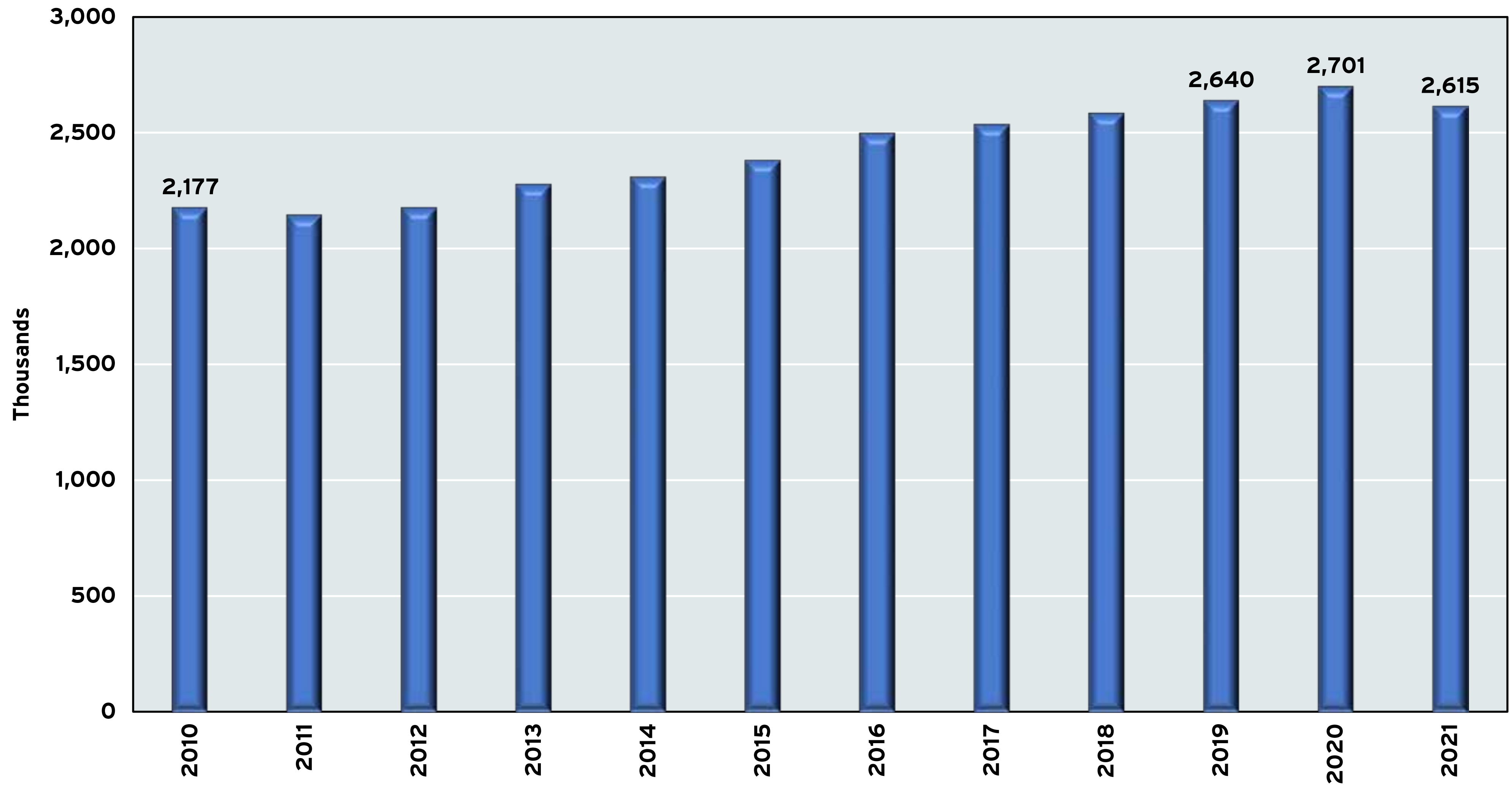
Current Employment 2022 Q1	Projected Employment 2032	Annual Employment Growth	Average Annual Supply	Average Annual Demand	Annual Supply Gap
3,114,311	3,346,326	0.8%	124,464	144,628	-20,164

Source: JobsEQ. Annual employment growth reflects the compound annual growth rate. Annual supply and demand estimates reflect the annual average accumulated supply and demand projections.

12 Kaiser. https://khn.org/news/lost-on-the-frontline-health-care-worker-death-toll-covid19-coronavirus/

GRAPH 7

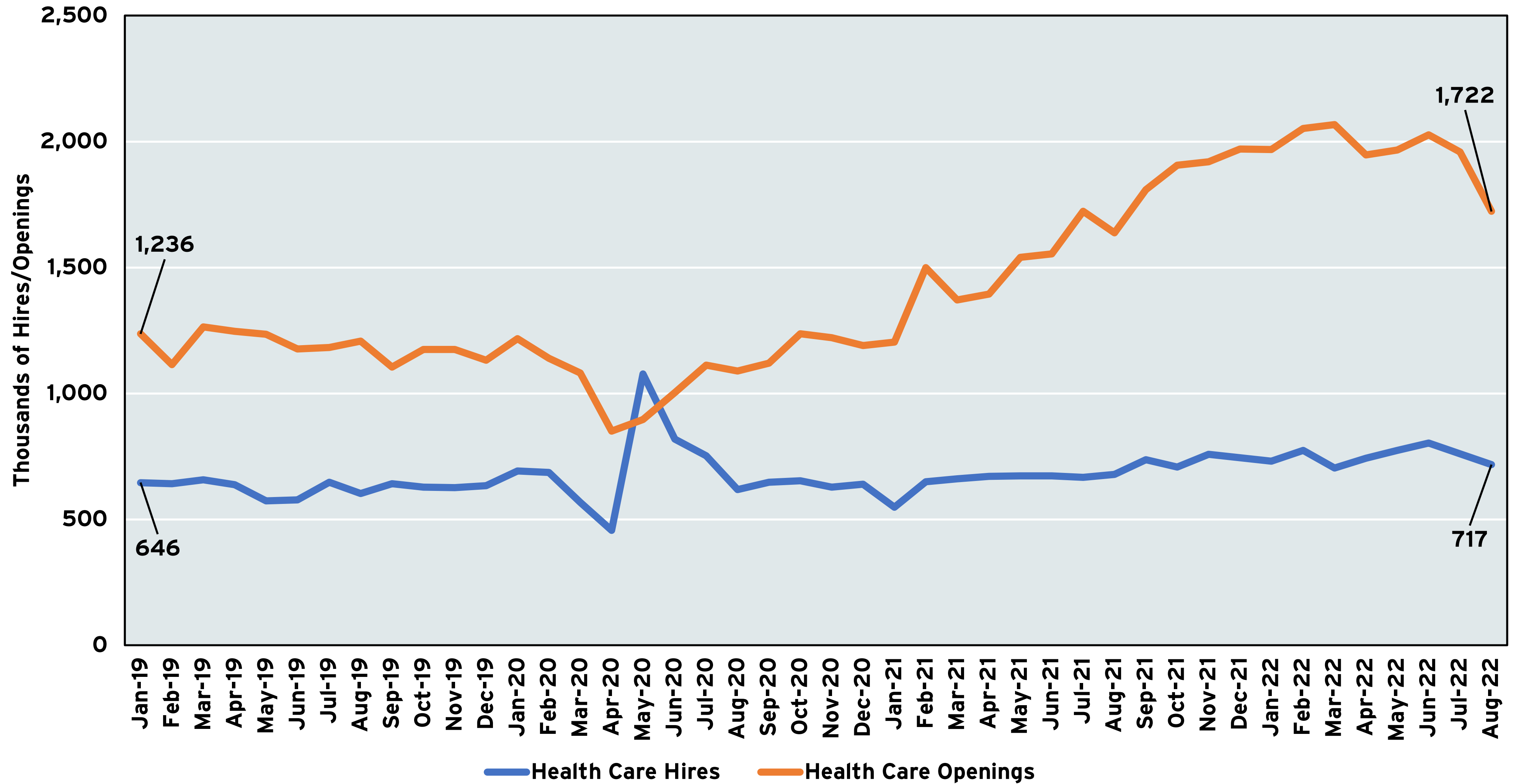
FULL-TIME REGISTERED NURSES
UNITED STATES, 2010-2021



Source: U.S. Bureau of Labor Statistics, employed full time: Wage and salary workers: Registered nurses occupations: 16 years and over [LEU0254487900A], retrieved from FRED.

GRAPH 8

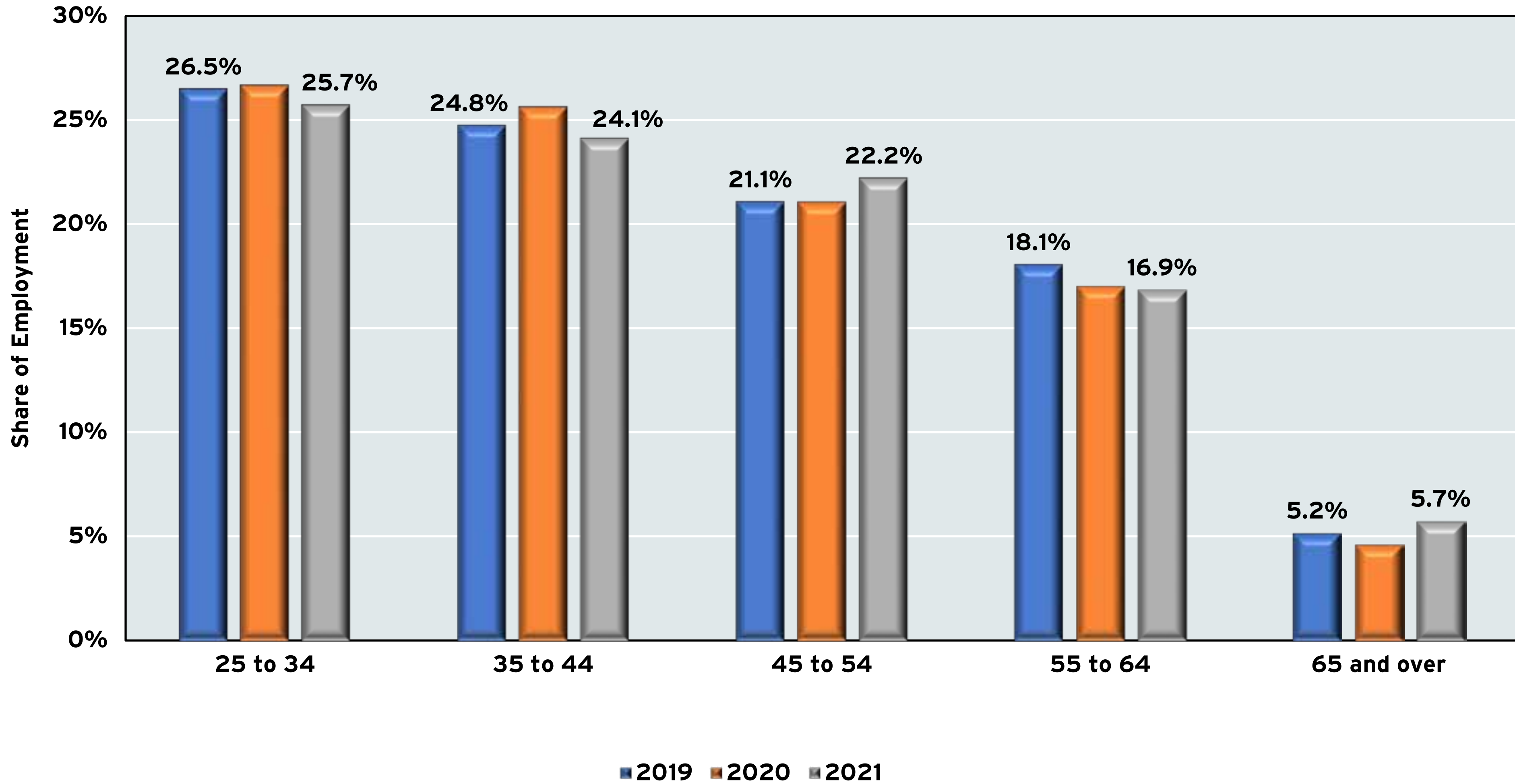
HEALTH CARE INDUSTRY JOB OPENINGS AND HIRES
UNITED STATES, JANUARY 2019 – AUGUST 2022



Source: U.S. Bureau of Labor Statistics, Job Openings and Labor Turnover Survey (JOLTS), seasonally adjusted data

GRAPH 9

REGISTERED NURSE EMPLOYMENT BY AGE GROUP
UNITED STATES, 2019, 2020, AND 2021



Source: U.S. Bureau of Labor Statistics, Current Population Survey (CPS). Table 11b. Employed persons by detailed occupation and age. Excludes age groups 16 to 19 years and 20 to 24 years.

Registered Nurses in Virginia

Given the impact of the COVID-19 pandemic, the national shortage of registered nurses, and the projected imbalance between the supply of new nurses and new jobs for those nurses, we need to analyze and ask what the future may hold for the Commonwealth.

Graph 10 displays data from the BLS on the employment of registered nurses in Virginia from the first quarter of 2012 to the first quarter of 2022. From 2012 Q1 to 2022 Q1, the average annual rate of employment growth for registered nurses in the region was higher than the overall rate of employment growth over the period.[13] However, the recovery in registered nursing employment has been somewhat tepid, significantly below the pre-COVID average rate of growth.

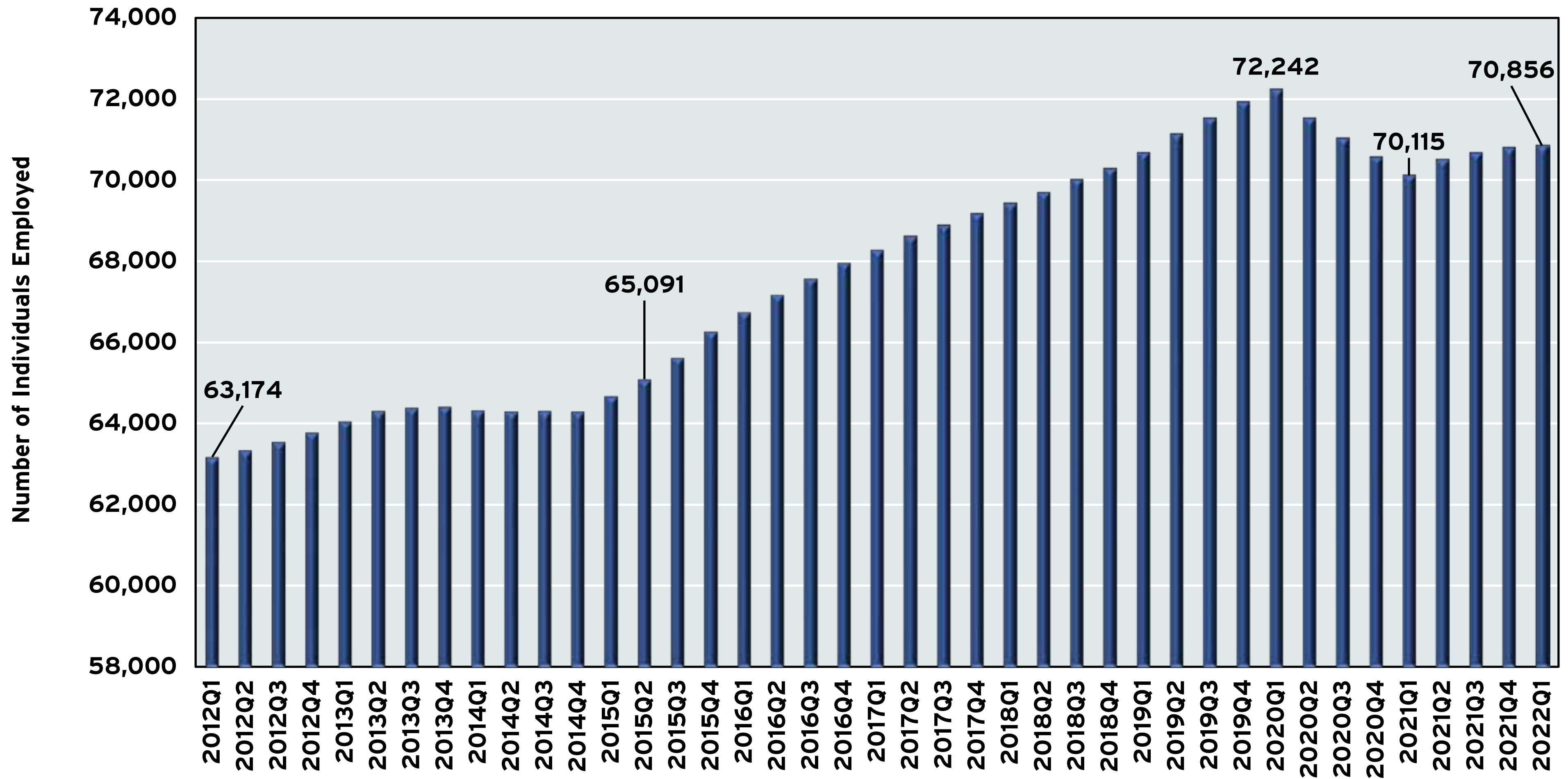
Graph 11 compares the growth in employment for registered nurses and all occupations in Virginia from 2012 Q1 to 2022 Q1. Registered nurses experienced less of a shock to employment than most workers in Virginia. Since the 2021 Q1 trough in employment, overall employment increased more than four times that of RNs. However, we must note that the estimated unemployment rate for registered nurses in 2021 Q4 was 1.3% compared to 4.6% for all employees. It should be no surprise that tepid economic growth and the relatively tight labor market for RNs has limited the pace of employment recovery.

We draw upon two sources to examine the state of the nursing profession, the Bureau of Labor Statistics (BLS) and the Virginia Department of Health Professions (DHP). The BLS administers the Occupation Employment Survey, a semiannual nationwide survey that is conducted with state employment agencies. The DHP collects feedback on an annual survey of nurses renewing their license in Virginia. License renewal is completed every two years, so for any given year, only half of the nurses will have access to the survey. More than 80% of nurses who are eligible to renew their nursing license responded to the survey, which provides one of the best opportunities to understand our regional nursing workforce.

13 The compound annual growth rate (CAGR) is equal to ((Last Period/Initial Period)^(1/number of periods))-1

GRAPH 10

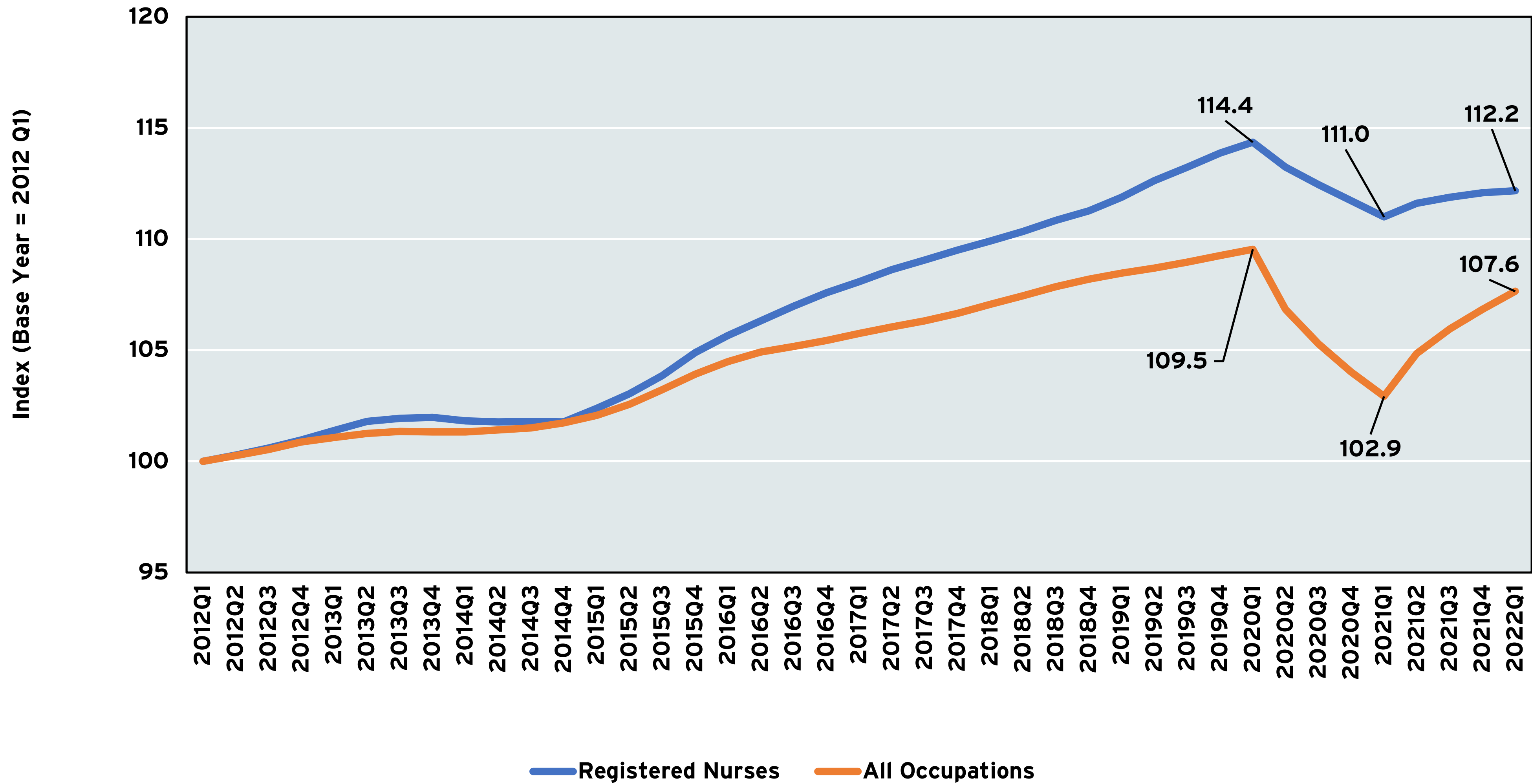
REGISTERED NURSES EMPLOYMENT
VIRGINIA, 2012 Q1 – 2022 Q1



Source: JobsEQ, four-quarter moving average. Employment by place of work. SOC 29-1141. Data as of 2022Q1.

GRAPH 11

**GROWTH IN EMPLOYMENT
REGISTERED NURSES AND ALL OCCUPATIONS
VIRGINIA, 2012 Q1 - 2022 Q1**



Source: JobsEQ, four-quarter moving average. Employment by place of work. Data as of 2022 Q1.

Will There Be Enough Nurses in Virginia?

One factor driving the demand for nurses over the coming years will be the aging of the national, state, and regional populations. Graph 12 displays the proportion of the population age 65 and older in Virginia and the United States in 2020 and the projected proportions for 2030 and 2040. In 2020, approximately 1 in 6 of the state's population was 65 or older. By 2030, it is anticipated that almost than 1 in 5 residents of Virginia will be age 65 or older.

As the population ages, the demand for health care and, consequently, registered nurses will increase as well. The population projections also do not account for the increase in the demand for health care for those suffering from long COVID-19. Concerns about the workload facing nurses may also lead to many stricter limits on patient-to-nurse ratios as research has shown that higher patient-to-nurse ratios are causally related to worse patient outcomes.[14] Other research has shown that as nurse activities (workload) increase, patient mortality in intensive care units increases.[15] In either case, restricting the number of patients a nurse can care for or limiting nursing workload (which would reduce the number of patients also) would increase the number of registered nurses required to maintain normal operations.

Table 3 provides estimates of the annual gap between the supply of and demand for registered nurses from 2022 to 2032. Even before we account for stress, burnout, and retirements, the supply of nurses falls short of anticipated demand. Virginia faces an average shortfall of 412 nurses a year over the coming decade. Compounding the state shortage of nurses is the likelihood of national shortages, leading to increased competition for nurses across the United States. Even if the Commonwealth increases its supply of new nurses, other states are likely to attract some (if not many) due to higher prevailing wages.

TABLE 3

POTENTIAL AVERAGE ANNUAL OCCUPATION GAPS FOR REGISTERED NURSES VIRGINIA, 2022-2032

Current Employment 2022 Q1	Projected Employment 2032	Annual Employment Growth 2022 - 2032	Average Annual Supply	Average Annual Demand	Annual Supply Gap
70,856	74,030	0.5%	2,729	3,140	-412

Source: JobsEQ. Annual employment growth reflects the compound annual growth rate. Annual supply and demand estimates reflect the annual average accumulated supply and demand projection.

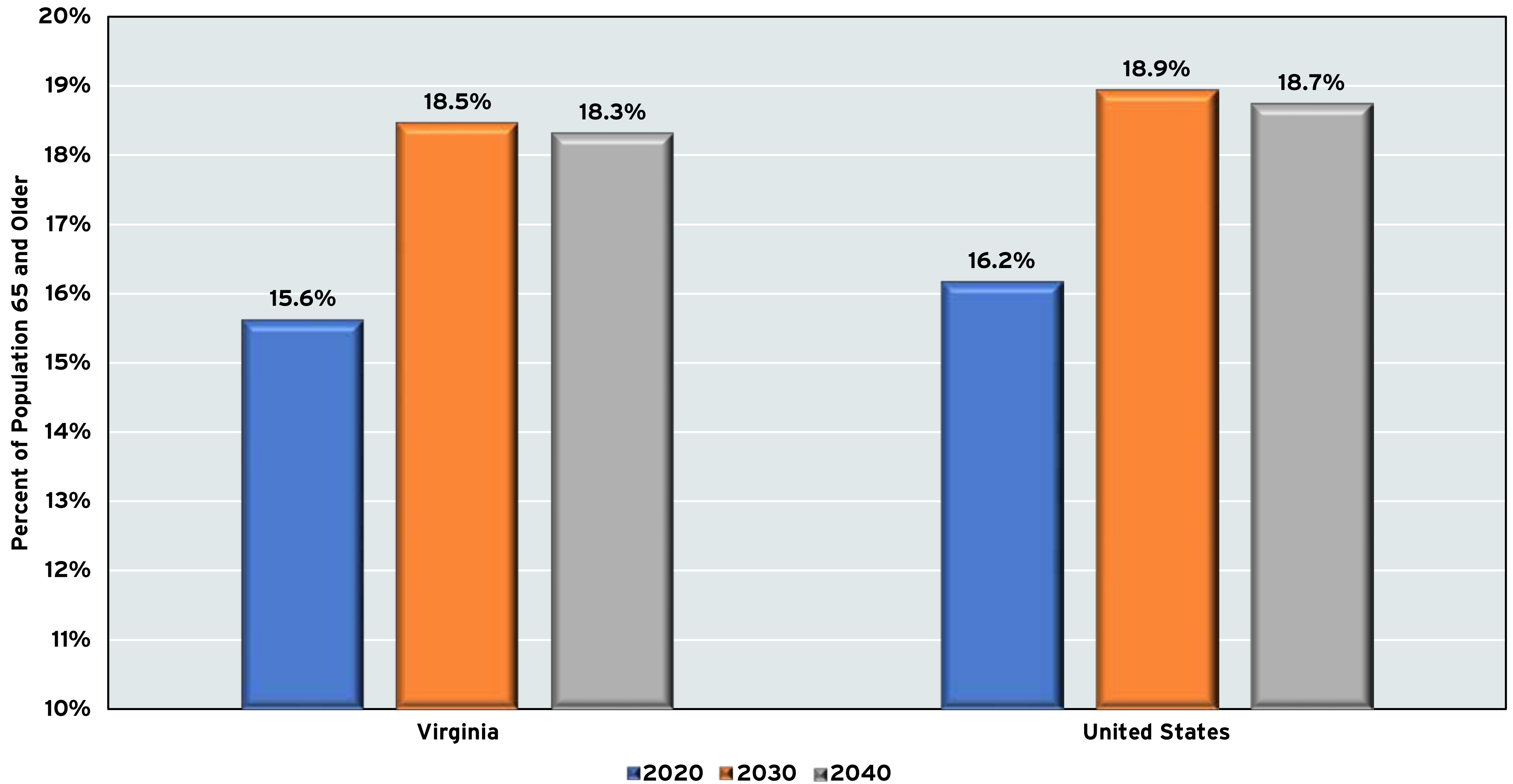
The gap between the supply of nurses and the demand for nurses is not merely a question of academic importance. As illustrated in Table 4, more rural areas of Virginia are likely to face increasing shortages of registered nurses over the coming decade. As the wage gap between urban and rural areas continues to increase, registered nurses (and other health professionals) will gravitate toward higher paying jobs in urban areas of the Commonwealth and nation. Much like we now observe "food deserts" in some areas of the region, we will see the rise of "nurse deserts" in the coming years.

14 Driscoll, A., Grant, M. J., Carroll, D., Dalton, S., Deaton, C., Jones, I., Lehwaldt, D., McKee, G., Munyombwe, T., & Astin, F. (2017). The effect of nurse-to-patient ratios on nurse-sensitive patient outcomes in acute specialist units: A systematic review and meta-analysis. *European Journal of Cardiovascular Nursing*, 17(1), 6–22.

15 Margadant, C., Wortel, S., Hoogendoorn, M., Bosman, R., Spijkstra, J. J., Brinkman, S., & de Keizer, N. (2020). The nursing activities score per nurse ratio is associated with in-hospital mortality, whereas the patients per nurse ratio is not*. *Critical Care Medicine*, 48(1), 3–9.

GRAPH 12

CURRENT AND PROJECTED SHARE OF THE POPULATION 65 AND OLDER
UNITED STATES AND VIRGINIA
2020, 2030, AND 2040



Source: Weldon Cooper Center for Public Service's Age and Sex Estimates, University of Virginia, and the Dragas Center for Economic Analysis and Policy, Old Dominion University.

TABLE 4

**CURRENT AND PROJECTED EMPLOYMENT GROWTH OF REGISTERED NURSES
UNITED STATES, VIRGINIA, AND VIRGINIA METROPOLITAN AREAS
2022 Q1 – 2032 Q1**

	RN Employment 2022 Q1	RN Share of Total Employment 2021 Q4	Location Quotient	Share of Population Age 65 and Older (2020)	10-Year Forecast Growth Rate	Retirements (Annual)	Retirement Rate (Annual)	2020 Median Annual Wage
Blacksburg-Christiansburg	1,208	1.7%	0.86	15.2%	2.0%	17	1.5%	$61,800
Charlottesville	3,732	3.2%	1.64	17.7%	1.5%	57	1.8%	$78,000
Harrisonburg	932	1.4%	0.69	15.0%	12.1%	15	1.7%	$63,100
Kingsport-Bristol	2,203	1.8%	0.91	22.0%	2.1%	44	1.9%	$59,800
Lynchburg	2,159	2.1%	1.04	18.8%	1.8%	43	1.9%	$71,700
Richmond	13,179	2.0%	1.00	15.6%	7.1%	217	1.8%	$75,900
Roanoke	4,725	3.0%	1.52	20.2%	-1.1%	73	1.9%	$67,500
Staunton	1,177	2.3%	1.15	20.4%	5.3%	24	2.1%	$74,200
Hampton Roads	15,268	1.9%	0.98	14.7%	2.0%	271	1.8%	$75,900
Washington-Arlington-Alexandria	48,857	1.5%	0.75	13.1%	4.0%	836	1.6%	$82,400
Winchester	1,450	2.1%	1.07	18.1%	5.1%	22	1.8%	$78,200
Virginia	70,856	1.7%	0.86	15.4%	4.5%	1,263	1.8%	$76,900
USA	3,114,311	2.0%	1.00	16.0%	7.4%	52,638	1.7%	$77,600

Source: JobsEQ, Census Bureau, American Community Survey (ACS), and the Dragas Center for Economic Analysis and Policy.

Why Don't We Have More Registered Nurses?

According to the American Association of Colleges of Nursing's (AACN) report, *2019-2020 Enrollment and Graduations in Baccalaureate and Graduate Programs in Nursing*, nursing schools across the nation turned away over 80,000 qualified applications from baccalaureate and graduate nursing programs in 2019. In the 2020 – 2021 academic year, 19,666 individuals applied to registered nursing programs in the Commonwealth (Graph 13). Of these applicants, 13,333 were academically qualified, 9,219 were admitted, but only 7,580 ended up enrolling in the programs. In other words, about 1 in 2 qualified applicants were not admitted into a nursing program.

If we need more nurses, why can't we just rapidly expand the supply of new nurses in the Commonwealth and nation? Unfortunately, the supply of new registered nurses is limited by bottlenecks in the nursing supply chain. Much like how a district shutdown in China or Russia's invasion of Ukraine can ripple through supply chains to limit goods at the local store in the United States, the supply of new nurses is constrained by a lack of qualified instructors, inefficient processes, and limits on the conventional factors of production. Let's briefly explore how these bottlenecks occur and the impact on the supply of new nurses.

HUMAN RESOURCE SHORTFALLS

Schools of nursing across the Commonwealth and nation are functioning with significant faculty shortages because of budget constraints, retirements (aged faculty), and increased competition with clinical practice. In one undergraduate program in Virginia, for example, workload calculations demonstrate the need for 26 full-time faculty where there are 14 currently employed. This significant gap is addressed through the process of continuously hiring, scheduling, calculating compensation, and evaluating over 50 adjunct faculty throughout the academic year. Adjunct faculty are essential in nursing education, but they do not traditionally have the capacity to assume other critical roles essential to growing enrollment including mentors, committee members, advisers, tutors, alumni developers, recruiters, or ambassadors of programs because of their commitment to their clinical practice. Table 5 shows the distribution of full and part-time faculty by type of registered nursing program in Virginia. The use of adjunct faculty is not a new phenomenon in academia, but unlike many faculty, nursing faculty can transition quickly to new jobs.

Within the next 10 years, it is anticipated that 23% of the current nursing workforce in the Commonwealth will retire. The five-year periods with the most anticipated retirements are 2020-25 and 2025-30. Among RNs who are age 50 and over, 30% expect to retire by the age of 65. Should a large portion of baby boomer faculty RNs exit the workforce earlier than expected, the supply would decrease more precipitously and disrupt this niche of the labor market.

TABLE 5

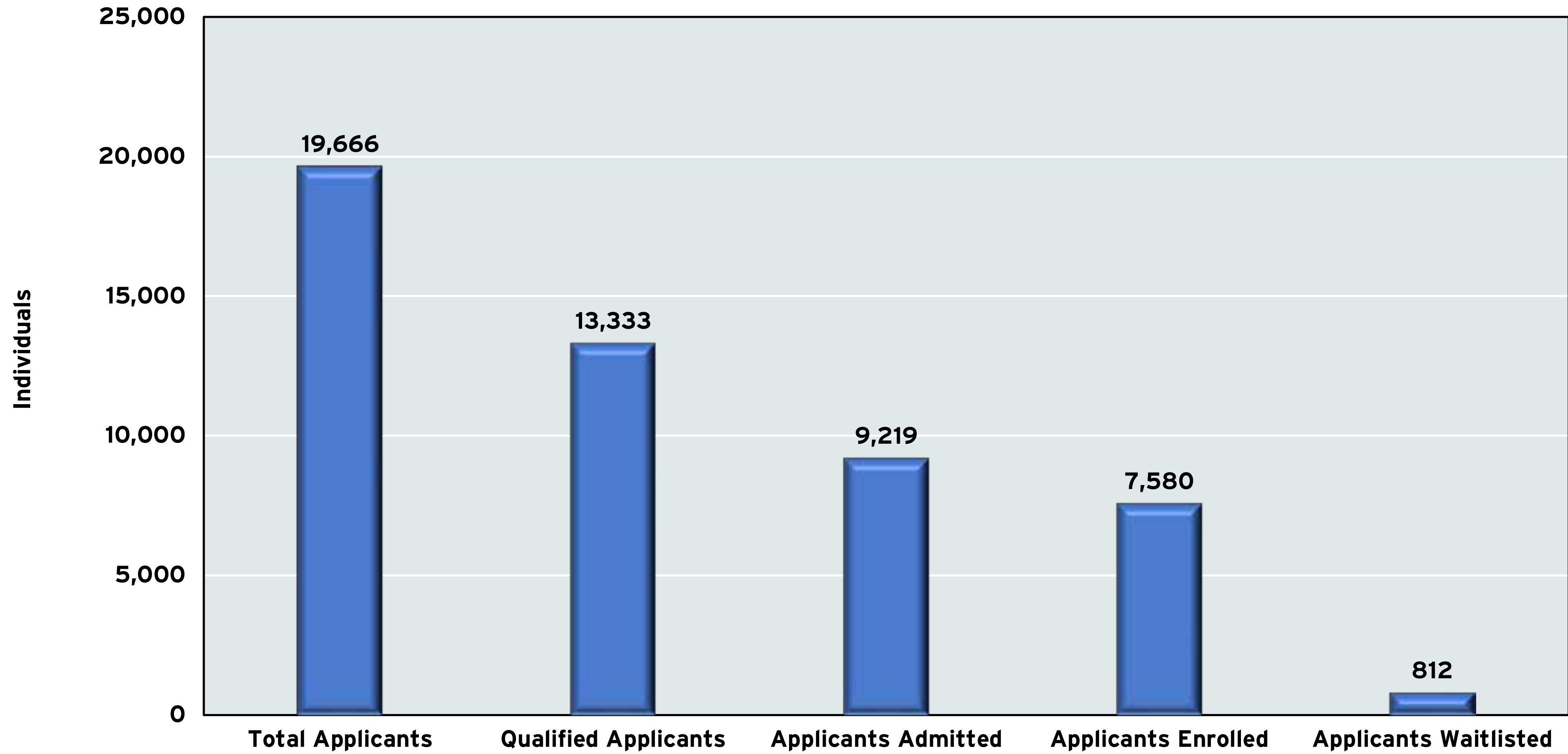
**FACULTY EMPLOYMENT
RN PROGRAMS IN VIRGINIA
2020-2021 ACADEMIC YEAR**

Program Type	Full Time	Part Time	Total	Percent Full Time
Accelerated Baccalaureate	77	122	199	38.7%
Associate	328	396	724	45.3%
Baccalaureate	435	506	941	46.2%
Associate Online	4	3	7	57.1%
Baccalaureate Online	36	21	57	63.2%
Accelerated Master's	10	0	10	100.0%
All Programs	890	1,048	1,938	45.9%

Source: Department of Health Professions, Virginia's Nursing Education Programs: 2020 - 2021 Academic Year. https://www.dhp.virginia.gov/media/dhpweb/docs/hwdc/nurse-ed/NurseEducation_2020-2021.pdf

GRAPH 13

APPLICATIONS TO REGISTERED NURSING PROGRAMS
VIRGINIA, 2020-2021 ACADEMIC YEAR



Source: Department of Health Professions, Virginia's Nursing Education Programs: 2020 – 2021 Academic Year. https://www.dhp.virginia.gov/media/dhpweb/docs/hwdc/nurse-ed/NurseEducation_2020-2021.pdf

With rising wages for nurses in clinical practice, it is becoming more and more difficult to recruit nurses as faculty. The average salary of a registered nurse working as a full-time employee in clinical practice in Virginia is, on average, $70,000-$80,000 annually.[16] By contrast, the average salary for a nurse working as a full-time faculty member in an undergraduate nursing program is around $65,000. With the growing number of travel nursing opportunities that carry a higher wage, this disparity can be substantially larger. Degree requirements also contribute to faculty shortages. To work as a faculty member in an undergraduate nursing program at a four-year university in the Commonwealth, the Virginia State Board of Nursing requires a minimum of a master's degree in nursing. To work in clinical practice, nurses are required to have an associate degree, with a bachelor's degree preferred.

INEFFICIENT REGULATIONS

Virginia law and Board of Nursing regulations require approval and oversight of all pre-licensure registered nursing programs located in Virginia and go to great lengths to ensure program quality. Once a program has been granted full approval, Board of Nursing regulations require an onsite survey of non-accredited programs every five years and accredited programs every 10 years. Programs must comply with several requirements including a minimum of 500 hours of direct patient care supervised by qualified faculty, that every faculty member must hold a graduate degree, and that preceptors must be licensed at a level at or above the level for which the students are preparing. While the purpose of the Board of Nursing is to ultimately ensure that nurses have the necessary knowledge and skills to practice safely and keep ethical standards, rigid compliance standards limit growth in academic enrollment.

In 2021, the AACN shared a new vision for academic nursing education derived in part from a review of current trends and "relevant assumptions regarding registered nurse preparation and practice."[17] Competency-based education is linked to explicitly defined performance expectations, based on observable behavior to a degree greater than it already is, and will require an increase and more frequent return for demonstrations and performance assessments using advanced technology and simulation. It is anticipated that the adoption of a competency-based educational model to maintain accreditation will require smaller faculty-to-student ratios as well as additional simulation and administrative support staff. These and other concerns related to accreditation requirements, such as impact on faculty development and resources and the financial impact on programs, have the potential to restrict growth in enrollment.

Further, many schools of nursing throughout the Commonwealth struggle to establish reliable partnerships with health systems and other affiliates to firmly secure clinical training opportunities for students. For example, there is stiff competition among nursing programs for required clinical training experiences and preceptors, especially in the specialized areas of pediatrics, obstetrics, and psychiatric and mental health. Further compounding the impact of such competition is the fact that proprietary schools of nursing are better positioned to compensate clinical sites for training; this strategy is of little advantage to programs housed at four-year public universities. The clinical training processes employed in professional nursing education are often inefficient; significant growth in enrollment is not likely to occur unless this problem is addressed.

LIMITS ON OTHER PRODUCTION FACTORS

Given the physical nature of professional nursing, programs are conducted with a significant degree of face-to-face, hands-on learning; this requires classroom and laboratory space. Faculty teaching in face-to-face educational nursing programs need private offices to counsel students and carry out their work in a distraction-free work environment. Programs require administrative offices for staff and other professionals whose work supports programmatic success. Large classrooms are necessary for large groups of learners to convene. Space is finite and limits on the same restrict growth in enrollment. The growth in nursing programs has primarily come from new entrants, not from the expansion of existing

16 Department of Health Professions.
17 American Association of Critical-Care Nurses (AACN)

programs; however, this is not a sustainable path forward to increasing the supply of new nurses in the future.

The Economic Cost of Nursing Shortages

Analyzing medical death rate data over an eight-year period, Johns Hopkins patient safety experts have calculated that more than 250,000 deaths per year are due to medical error in the U.S.[18] This figure surpasses the Centers for Disease Control and Prevention's (CDC's) third-leading cause of death, respiratory disease, which kills close to 150,000 people per year. While the health care system in the U.S. does not employ robust error-reporting mechanisms from which we can learn, patient safety experts have identified the root causes of many preventable medical mistakes. These include poor systems, inadequate communication, ineffective teamwork, and low levels of provider situation awareness. High levels of situation awareness are essential to quality care and patient safety in nursing and amounts to having a really good understanding of any given clinical situation. Inadequate situation awareness is a result of fatigue, distractions, stressful situations, high workload, vigilance failures, poorly presented information, forgetting key information and poor mental models.[19] In nursing, inadequate situation awareness is more likely to occur when nurse staffing is low relative to the number of patients needing care.

There is a growing body of evidence that demonstrates a relationship between low RN staffing levels and changes in the quality and quantity of patient care interventions, indicating that a reduction in nurse staffing adversely affects care quality. Nurses' vigilance at the bedside is essential to their ability to ensure patient safety. Assigning increasing numbers of patients to each nurse eventually compromises his or her ability to provide safe care.[20]

Nurses' education and training appear to be linked to patient outcomes. One study showed lower inpatient mortality rates for a variety of surgical patients in hospitals with more highly educated nurses. This finding has resulted in calls for all nurses to have at least a baccalaureate education, which was one of four key recommendations of the landmark Institute of Medicine report, *The Future of Nursing: Leading Change, Advancing Health*.[21]

High-quality professional nursing care is a vital component of the economy and the health care system in Virginia. More than 70,000 registered nurses are employed in Virginia. As health care costs continue to increase, concerted efforts to improve the efficiency and effectiveness of the health care system must consider nurses' contributions to the same.

18 Makary, M. A., & Daniel, M. (2016). Medical error—The third leading cause of death in the US. *BMJ*, 353, i2139. https://doi.org/10.1136/bmj.i2139
19 Endsley, M. R. (1995). Toward a Theory of Situation Awareness in Dynamic Systems. *Human Factors*, 37(1), 32–64. https://doi.org/10.1518/001872095779049543
20 Phillips, J., Malliaris, A. P., & Bakerjian, D. (2021, April 21). Nursing and patient safety. Patient Safety Network. Retrieved December 9, 2022, from https://psnet.ahrq.gov/primer/nursing-and-patient-safety
21 Institute of Medicine (US) Committee on the Robert Wood Johnson Foundation Initiative on the Future of Nursing, at the Institute of Medicine. (2011). *The Future of Nursing: Leading Change, Advancing Health*. National Academies Press (US). http://www.ncbi.nlm.nih.gov/books/NBK209880/

Travel Nursing and COVID: A Complicated Market Response to the Increased Demand for Nurses

The rise of contract or travel nursing has also become a major challenge for the health care industry. The wage disparities between travel nurses and nurses that work as full-time employees of hospitals can create disharmony in the workplace as it is common for these two providers to work side by side. As COVID-19 hotspots and unprecedented nursing shortages emerged across the country, staffing agencies aggressively recruited and contracted with nurses to 'travel' to areas to provide care at much higher wages than they would earn as full-time hospital employees. Some hospitals were left with no options but to bring travel nurses on board to fill the workforce gap without the capacity to offer competitive wages to their full-time staff.

However, as Covid hospitalization rates began to stabilize federal and state Covid relief funding dissipated, and the travel nurse contracts that were once lucrative started to vanish by late 2022. In fact, a class action lawsuit was filed in August 2022 against a national health care staffing agency, Aya Healthcare, Inc. accusing the company of running a "bait and switch" program by routinely reducing pay halfway through the nursing contract.

Final Thoughts

We recommend expanded efforts to identify and quantify the economic value of nursing in Virginia because greater utilization of nurses in health care services has significant potential to control or possibly reduce costs related to care. These costs are distributed among different groups, including federal and state governments, who provide support for nursing education and research and pay for health care services provided through public health insurance programs; employers, who pay nurses' wages and pay much of the cost of health benefits; and health care consumers, who bear some costs of their own health care services and premiums.

Nursing also provides services with economic value in that nursing care generates payments to hospitals, home health agencies, nursing homes, clinics, and other providers. Nursing services output decreases hospital lengths of stay, prevents illness, and reduces preventable errors, complications, and readmissions, all of which save money for providers and health plans.[22] Similarly, excellent nursing care facilitates rapid recovery from illness and injury and decreases overall mortality, resulting in increased productivity.

There is significant potential for schools of nursing to develop nurse faculty residency-type programs that emphasize strategies to improve faculty recruitment, preparation, development, and retention. Schools should further develop their distance learning infrastructure to include programs that advance faculty competencies in the pedagogy of teaching and the evidence-based use of technology, simulation, and distance learning and teaching techniques. Educational programs with the capacity to do so can develop and operate nurse-led interprofessional primary care clinics in collaboration with community partners to serve homeless, uninsured, and Medicaid-eligible members of the community; these clinics will also double as robust clinical training sites for nursing and other related health sciences students.

It is imperative that institutions of higher education develop strong, committed, and long-lasting partnerships with health care providers to create additional training sites in Virginia to sustain growth in enrollment.

22 Keepnews, David. (2013). "Mapping the Economic Value of Nursing: A White Paper." Seattle: Washington State Nurses Association.

Academic-practice partnerships are mechanisms for advancing nursing practice to improve the health of the public. Intentional and formalized relationships are based on mutual goals, respect, and shared knowledge between a nursing education program and a care setting. Such relationships are defined broadly and may include partnerships between nursing and other professions, corporations, government entities, and foundations.

One recommendation to increase the number of nurses in Virginia is to make nursing more attractive as a profession. Hospital systems and other employers can extend some of the privileges afforded to physicians to their nursing staff. Housing allowances for physicians? How about housing allowances for nurses? Educational loan forgiveness programs for physicians? How about educational loan forgiveness programs for nurses? Hospitals often declare the important roles of nurses, but actions may speak louder than words. When some members of the team are treated differently from other members of the team, a hierarchy is established which communicates that some members have higher value than others. All health care providers play a critical role on the team and should be treated and recognized accordingly.

Professional nurses are counted on by the U.S. health care system as essential to expanding access to care for all, reducing costs related to health care, and improving health and the quality of health care for a thriving economy and enhanced quality of life. The National Academy of Medicine's *Future of Nursing 2020-2030: Charting a Path to Achieve Health Equity* report identifies professional nurses as powerful agents to help all Americans live longer, healthier lives which, by default, boosts the economy. Academic institutions, the health care community, insurance companies, and government and community members must work together to create an efficient production process to connect those interested in becoming a nurse to the thousands of nursing jobs waiting to be filled.