University of California
San Francisco

**UCSF Health Workforce Research Center
On Long-Term Care**

Research Report

Employer Demand for Physician Assistants and Nurse Practitioners to Care for Older People and People with Disabilities

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December 2017

This project was supported by the Health Resources and Services Administration (HRSA) of the U.S. Department of Health and Human Services (HHS) under grant number U81HP26494, Cooperative Agreement for a Regional Center for Health Workforce Studies. This information or content and conclusions are those of the authors and should not be construed as the official position or policy of, nor should any endorsements be inferred by HRSA, HHS, or the U.S. Government.

We would like to acknowledge the Physician Assistant Education Association, Washington, D.C., which funded data acquisition via a grant award to our research collaborators at Duke University, Perri Morgan, PhD, and PA-C and Brandi Leach, PhD. Funding of this project does not necessarily constitute an endorsement of the findings of this research report by the Physician Assistant Education Association.

Please cite as: Himmerick KA, Miller J, Toretsky C, Jura M, Spetz J. (2017). Employer Demand for Physician Assistants and Nurse Practitioners to Care for Older People and People with Disabilities. San Francisco, CA: UCSF Health Workforce Research Center on Long-Term Care.

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Employer Demand for Physician Assistants and Nurse Practitioners to Care for Older People and People with Disabilities

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Executive Summary

Introduction/Background

Demand for healthcare professionals with expertise in long-term care (LTC) and older populations is rising, due to projected growth in the older population and the increasing burden of chronic disease. One way to meet this growing LTC workforce demand may be to employ more nurse practitioners (NPs) and/or physician assistants (PAs). Studies have demonstrated the value of NPs and PAs in the care of older people, including when they are substituted for physicians.

This study is intended to inform educators, employers, and policymakers about employer demand for PAs and NPs in the care of older and disabled populations and to guide federal investments in workforce development and planning for these high-growth populations.

Methods

In this descriptive, cross-sectional study, we analyze job posting data for 2014 from a leading labor analytics firm and compare job postings in LTC and for care of elders and people with disabilities with occupied positions and with the overall job market for NPs and PAs.

Findings

- In 2014, 1 in 10 job openings for NPs and PAs were focused on care for older persons and/or people with disabilities
- Half of the jobs for this population required ≥1 year of experience, limiting the opportunities available to new graduates
- NPs are in higher demand than PAs for jobs caring for older people and people with disabilities
- More than half of jobs focused on care of older and disabled populations are in primary care specialties
- The employment market for positions in LTC and care for older and disabled populations appears to be expanding for both NPs and PAs
- Twice as many NPs as physicians are employed in settings focused on older and disabled populations

- Employer demand for NPs and PAs in LTC and care for older persons/people with disabilities is low relative to specialty care

Conclusion

While job opportunities abound for NPs to care for older persons and those with disabilities, we have identified the lack of job availability for PAs as a potential barrier to entry. Employers may not fully understand PA education and how PAs are prepared to fill employment gaps for geriatric and disabled populations. NPs often have specific course content in gerontology and geriatrics, and most NPs focus on ambulatory care during their education. PAs also have education in these areas, as well as in surgery and other hospital-based and specialty fields. Employer demand for both NPs and PAs in specialty care is considerably higher than for primary care, and market forces alone are not likely to reverse this trend.

Policy Implications

Given the high employer demand for NPs and PAs in LTC in 2014, educators should develop curricula that prepare NPs and PAs for careers in care of elders and people with disabilities. Even brief, targeted exposures to geriatric and long-term care patients during training have been shown to improve students' knowledge and preparation for these careers.

Given that NPs comprise a larger percentage of the home health and nursing and residential care facility clinician workforce than physicians, policymakers should consider the impact of restrictive scope of practice legislation on access to care for aging and chronically disabled constituents. Educators, employers, and policymakers must work together to strengthen the health workforce and improve healthcare access for aging and chronically disabled populations.

Employer Demand for Physician Assistants and Nurse Practitioners to Care for Older People and People with Disabilities

Background

By 2030, people age 65 years and older are projected to account for 20% of the U.S. population.[1] Demand for healthcare professionals with expertise in long-term care (LTC) and older populations is rising, due to this aging population and the increasing burden of chronic disease.[2,3] One way to meet this growing LTC workforce demand may be to employ more nurse practitioners (NPs) and/or physician assistants (PAs) in settings that provide long-term care and geriatric services.[4,5] Overall, the supply and employment outlook for NPs and PAs is robust. In 2016, there were an estimated 234,000 licensed NPs in the U.S. and half as many certified PAs (115,547).[6,7] According to the Bureau of Labor Statistics 67% of all licensed NPs were employed in NP jobs (155,500), while 92% of all certified PAs were employed in PA jobs (106,200).[8,9] Those not working in their licensed field are often employed in another related occupation, including serving as faculty in a health sciences program, a manager or director of a healthcare organization, or in another clinical role, such as registered nurse. The BLS predicts that in the next decade NP employment will experience 35% growth, with 37% predicted growth for PAs[8,9]; far exceeding the 7% average occupational growth rate.

NPs and PAs are well-positioned to care for the physical, mental, and social needs of the aging population.[10] In 2017, approximately 88% (234,000) of all licensed NPs were trained to care for older adults, including 10% (23,000) certified specifically in gerontology.[6] PAs are a flexible workforce educated in the generalist medical model to care for patients across the lifespan, including older adults.[11] Although all PAs are trained to care for aging patients, the National Commission on Certification of Physician Assistants reported that <1% of PAs (700) practiced in geriatrics and hospice/palliative care specialties in 2016.[7]

From 2000 to 2010 an increasing number of LTC facilities, geriatric care providers, and organizations that serve those with disabilities employed NPs and PAs, although their roles are limited by state scope of practice laws, professional guidelines, federal and local government policies and regulations, and the reimbursement structure.[12-14] Studies have demonstrated the value of NPs and PAs in the care of older people, including when they are substituted for physicians.[15] Their employment in nursing homes has been shown to reduce the rate of potentially avoidable

hospitalizations and improve a variety of outcomes,[16-19] and their engagement in care also has positive impacts on managing chronic obstructive pulmonary disorder,[20] caring for those with complex conditions in home-based settings,[21] pain management in LTC,[22] and home-based congestive heart failure care.[23]

Surveys traditionally used to monitor employment markets, including those from the Census Bureau and Bureau of Labor Statistics (BLS), do not provide information on specialty of practice for NPs and PAs, which presents a barrier to understanding how NPs and PAs are distributed within the healthcare workforce. Real-time labor market information is an emerging source of data that identifies job openings by specialty and setting that has been used as an indicator of market demand for PAs and NPs. Previous work with real-time labor market data demonstrates that low employer demand for primary care PAs might contribute to growing PA specialization.[24] Similar market forces might influence the workforces employed in LTC and in care for older and disabled populations.

This report describes the national employment market for NPs and PAs in LTC settings and in the care of older and disabled populations. We captured job openings for PAs and NPs in the care of older and disabled populations and compare these to other settings and specialties. This study is intended to inform educators, employers, and policymakers about employer demand for PAs and NPs in the care of older and disabled populations and to guide federal investments in workforce development and planning for these high-growth populations.

Methods

In this descriptive, cross-sectional study, we analyze job posting data for 2014 from a leading labor analytics firm and compare job postings in long-term care and elder/disabled care with occupied positions and with the overall job market for NPs and PAs.

Data Sources

National data on 2014 job postings for NPs and PAs were obtained from Burning Glass Technologies (BGT), a leading labor analytics firm.[25] BGT collects information from online job postings by monitoring over 38,000 websites. Data for specific variables, such as job title, location, and employer are extracted from each posting. Using these variables, BGT de-duplicates the postings to create a high quality dataset that represents the vast

majority of job postings.[26,27] Additional information about BGT data collection, processing, and validity has been previously published.[24]

We compared real-time labor market data from BGT with existing employment data from the BLS Occupational Employment Statistics for NPs and PAs obtained from the BLS online query system.[28] The BLS uses a consistent methodology to track employment across all industries and occupations in the U.S including NPs and PAs as well as physicians.

Sample

We reviewed 117,571 job postings in the BGT data that advertised NP and/or PA jobs and excluded postings that advertised non-clinical jobs (173), were from Guam and Puerto Rico (12), had missing data (4,214), or were not for NPs and/or PAs (457). This resulted in a final sample of 112,715 NP and/or PA job postings. We analyzed the final sample to identify job postings seeking NPs and PAs to work in settings focused on long-term care, geriatrics, and services for persons with disabilities.

Measures

Clinician Type

Each posting was examined to assign a variable indicating whether the job was for an NP, a PA, or available to both. Only 7% of postings associated with the care of older persons/ people with disabilities were for a PA and 8% were for either an NP or a PA. The characteristics of these job descriptions were similar to each other and thus in some analyses we combined all jobs available to PAs into a single category.

Experience Required

Jobs were coded as either no experience required or experience required. Experience required was defined as requiring applicants to have ≥1 year of experience in a relevant field. Job postings that did not mention experience or that required <1 year of experience were coded as no experience required.

Practice Setting

Three BLS healthcare sector groups were used to define settings for our study: ambulatory healthcare services, hospitals, and nursing and residential care facilities. We further subdivided these groups into specific settings (Table 1). We excluded jobs posted for settings that do not deliver LTC

services such as retail clinics, urgent care centers, emergency departments, residential mental health facilities, and substance abuse treatment facilities.

Table 1: Setting Categories for Job Openings

Healthcare Sector Group	**Settings**	**Settings excluded from analysis of LTC and geriatric/disabled-related positions**
Hospital	Hospital/Inpatient	Emergency Department*
Ambulatory Care	Clinic/Outpatient	Retail Clinic
	Mobile Medicine	Urgent Care
	Telemedicine	
Home Health Care	Home Health Care	
Nursing and Residential Care	Assisted Living	Post-Acute Care Facility*
	Nursing Home	Rehab/Rehabilitation*
	Residential Facility	Residential Mental Health Facility
	Retirement Community	Substance Abuse Treatment Facility
	Skilled Nursing Facility	
	Supported Living	
	Transitional Care	

*Excluded unless job posting explicitly specified care for predominately geriatric and/or disabled populations

Practice Specialty

We categorized practice specialties following the nomenclature employed by other studies of job openings for PAs as primary care, specialty care, or unknown.[24,29] In the primary care category, we included family medicine, general internal medicine, general pediatrics, general geriatrics, women's health, and primary care postings. Specialty care included surgical specialties, medical subspecialties, emergency/urgent care, and other. Job descriptions varied substantially in terms of the quantity and quality of information provided. When specialty could not be determined it was coded as unknown.

Geriatric and/or Chronically Disabled Care

Older people and people with disabilities receive care in a variety of practice settings and specialties. Coding practice setting and specialty separately allowed us to cast a wide net to identify as many positions associated with the healthcare of older people and people with disabilities as possible. Job openings were coded as being associated with older and disabled populations if they were located in a nursing home or residential care setting or were in a specialty for which the job posting indicated the majority of care was provided to geriatric and/or chronically disabled populations. Thus, postings in ambulatory and hospital settings were included only if the posting specified that the population served was primarily older and/or disabled. We excluded mental health and substance abuse postings from the elder/disabled-care category. We also excluded job postings in specialties or settings that primarily involve administrative or educational duties.

Analyses

We employed a combination of automated, manual, and machine learning analyses to develop our findings. The on-line technical appendix to this report contains detailed methods, descriptions of data collection, coding, and analyses.

Automated Analysis

We developed text searches using SAS (version 9.3) to identify jobs associated with care for older persons and people with disabilities. The following words and phrases were included in the search: “long term care”, “long-term care”, “assisted living”, “nursing home”, “personal care facility”, “residential continuing care facility”, “continuing care”, “hospice”, “palliative care”, “retirement community”, “supported living”, “transitional care”, “rehab”, “rehabilitation”, “geriatric”, “geriatrics”, “post-acute care facility”, “post-acute care facility”, “eldercare”, “elderlycare”, “board and care homes”, and “skilled nursing facility”. Both lowercase and uppercase versions of these phrases were searched. The automated text search retrieved 20,236 job postings that contained at least 1 of these terms.

Manual Analysis

A random sample of 20% of the postings from the automated analysis were cross-checked with manual coding to analyze accuracy of the results of the automated analysis. We extrapolated results of the manual analysis sample (4,000) to the automated text search sample (20,236). For these 4,000

postings, a trained coder assigned clinician type, practice specialty, practice setting, and experience required. The coder also determined whether the posting was for a position in LTC or working with older/disabled populations. The principal investigator (PI) repeated coding of a subset of the coder's work and provided coaching until greater than 95% agreement was reached regarding assignment of specialty, setting, LTC designation, and clinician type (NP, PA, or both). The coder flagged any job posting that presented uncertainty and the PI made a final adjudication.

Machine Learning Analysis

We employed machine learning methods to reduce the time required to categorize job openings by practice specialties. Machine learning (ML) constructs algorithms that can learn from and make predictions with unstructured text data.[30] The method requires that a set of data be coded to provide a "gold standard" against which the algorithms can be calibrated. We used codes from a prior study that examined PA jobs in the BGT posting data to establish the gold standard.[24] The text mining infrastructure for this portion of the analysis was built in R version 3.4.1.[31] The data were prepared by reducing unnecessary words and characters from the job descriptions (including removal of web addresses and punctuation) and then weighting term frequencies to reduce weight for more common words while increasing weight for less common and more specific words or word pairs. For example, we decreased the weight of common words such as "clinic" and "clinician" and increased the weight of specific words such as "primary care" and "orthopedics." Jobs were coded into three categories: primary care, specialty, and unknown. Neural networks were trained with 10-fold cross-validation and the model was tested and tuned against a 20% sample of the gold standard data. The chosen model was had the lowest misclassification rate.

Results

Key Findings

- In 2014, one in ten job openings for NPs and PAs were positions focused on care for older persons and/or people with disabilities
- Half of the jobs for this population required ≥1 year of experience, limiting the opportunities available to new graduates
- NPs are in higher demand than PAs for jobs caring for older people and people with disabilities

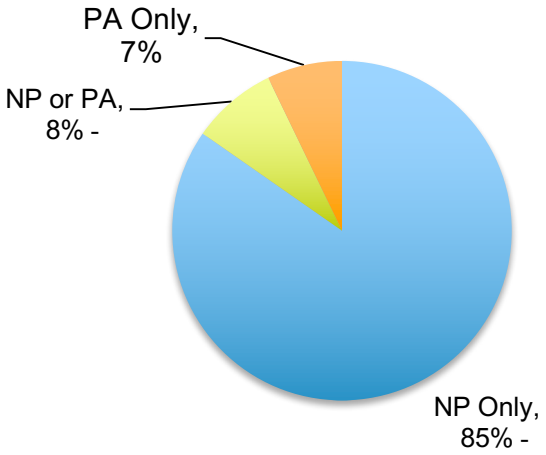
- More than half of jobs focused on care of older and disabled populations are in primary care specialties
- The employment market for positions in LTC and care for older and disabled populations appears to be expanding for both NPs and PAs
- Twice as many NPs than physicians are employed in settings focused on older and disabled populations
- Employer demand for NPs and PAs in LTC and care for older persons/people with disabilities is low relative to specialty care

Distribution of Job Openings in Long-Term Care and Care of Elders/People with Disabilities

Job posting data provide an opportunity to assess future growth in the employment market for NPs and Pas, viewed through the lens of employer demand. Our analysis of 2014 job posting data from BTG indicates that 10% of job openings for PAs and NPs were in LTC or other positions focused on care for older/disabled populations, totaling 11,099 job postings nationwide. The vast majority of job openings in LTC and elder/disabled care were solely for NPs (85%), while merely 8% were open to both NPs and PAs, and 7% were for PAs only (Figure 1). Among all NP jobs, 15.6% were in LTC or care for older/disabled populations, while only 3.2% of PA job openings were in these fields. NP job openings in long-term and geriatric-focused care were substantially over-represented relative to the total workforce, in which more than one-third of NP and PA jobs are held by PAs. This is not surprising given the number of NPs with education specifically in geriatrics; however, employers that advertise for NPs only may be missing an opportunity to meet their clinician workforce needs with PAs.

Half of the jobs for NPs and PAs in LTC and geriatric or disabled care (53%) required ≥1 year of experience, limiting the opportunities available to new NP and PA graduates. Expanding opportunities to new graduates could provide a workforce solution in LTC and the care of elders and people with disabilities. Hiring new graduates may require formal residency training or well-designed onboarding processes to prepare them for success.

Figure 1. Distribution of NP and PA Job Openings in Long-Term Care and Care of Elders and People with Disabilities: 2014 Data



Source: Proprietary data from Burning Glass Technologies, 2014
Notes: For the remainder of this analysis job openings for PAs Only and NPs or PAs are combined into a single category of jobs available to PAs and compared with jobs available to NPs only. Sample size = 11,099 job postings in geriatric and chronically disabled care

PA and NP Job Openings by Specialty

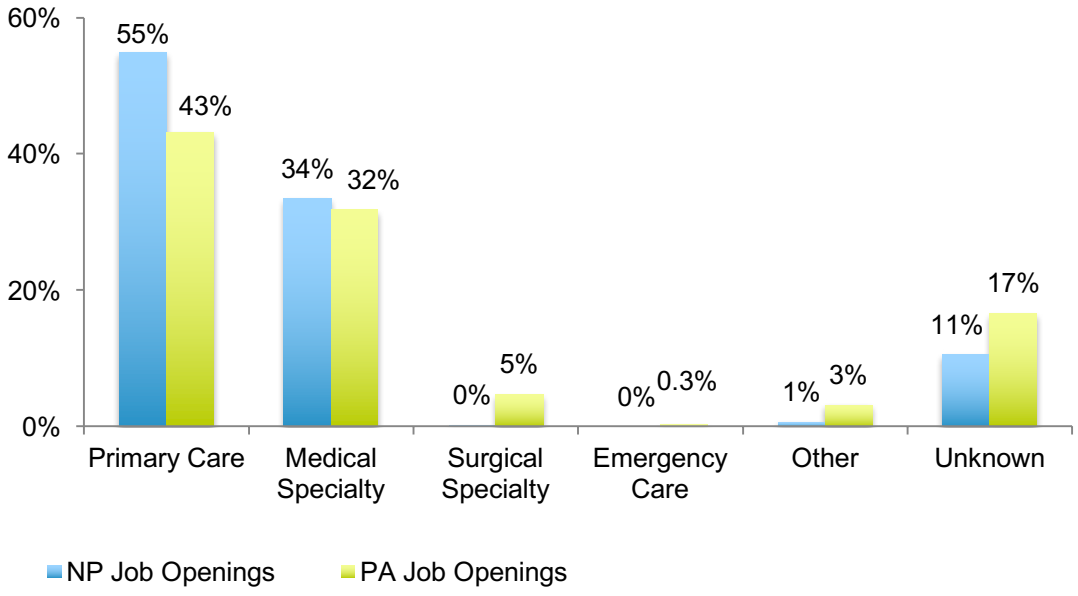
As seen in Figure 2, about half of employer demand for NPs and PAs in LTC and care for older persons/people with disabilities was for primary care specialties (55% and 43%, respectively) and approximately one-third was for medical specialties (34% and 32%, respectively). The most frequent specialties were geriatrics (36%) and hospice/palliative care (20%). In 2016, less than 1% of certified PAs practiced in the internal medicine sub-specialty of geriatrics and less than 0.1% practiced in hospice and palliative medicine, leaving NPs to fill the bulk of workforce needs in these fields.[7]

Some differences were revealed between the specialties that seek NPs versus PAs for positions focused on care of older or disabled people. All PAs are prepared for careers in surgery, and a previous analysis of PA job openings in 2014 found that the largest proportion of job postings for PAs were in surgical specialties (28%).[29] We also found that a higher percentage of jobs in surgical specialties were available to PAs (8%) compared with NPs (<1%). Notably, these surgical job openings were rare relative to primary care and medical specialties and were most commonly in orthopedics, urology, and cardiothoracic surgery practices serving exclusively geriatric populations.

To our surprise, the manual coding process revealed 5 job postings for PAs in emergency care serving exclusively geriatric populations. A geriatric emergency department staffed by clinicians with expertise in geriatric care, analogous to a pediatric emergency department, is a novel solution to care for the unique and often complex medical and pharmacological issues of older adults presenting for emergent care.

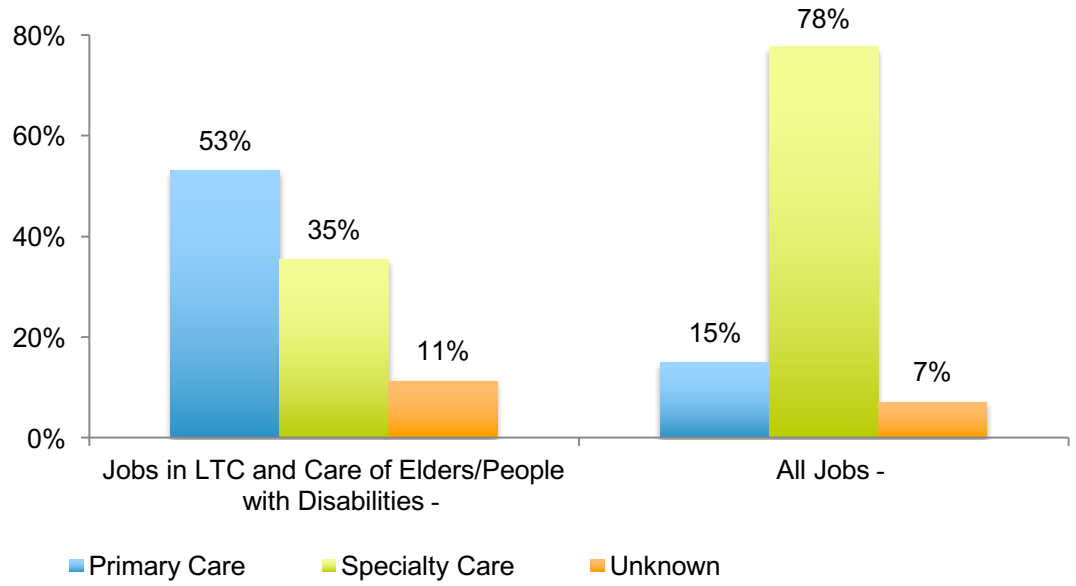
To provide context for the data on NP and PA job postings in LTC and care for older and disabled populations, we compared these results to job openings for all NPs and PAs in 2014 (110,926) using machine learning methods to code jobs by specialty care or primary care. We found that 15% of all NP and PA job openings were in primary care in 2014 (Figure 3). The vast majority of all NP and PA job postings (78%) were for positions in specialty care.

Figure 2. Distribution of NP and PA Job Openings by Clinical Specialty in Long-Term Care and Care of Elders and People with Disabilities: 2014 Data



Source: Proprietary data from Burning Glass Technologies, 2014

Figure 3. Percentage of NP and PA Job Openings in Primary and Specialty Care

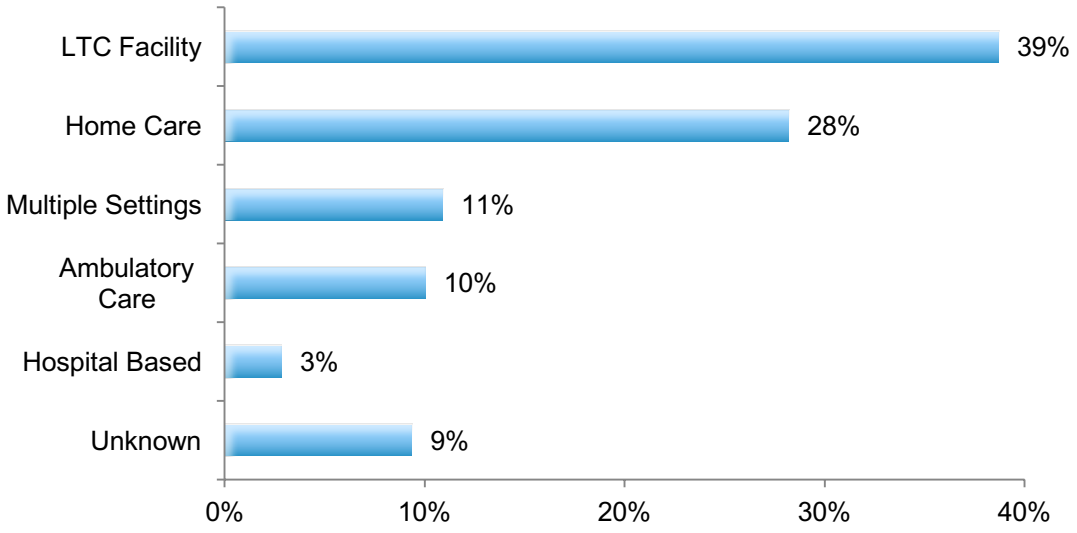


Source: Proprietary data from Burning Glass Technologies, 2014
Note: Jobs in LTC and care of elders/people with disabilities n=11,099; All jobs n = 110,926 Excludes 1,789 jobs for which the job description was insufficient for machine learning analysis

Job Openings in Long-Term Care and Care of Elders/People with Disabilities by Setting

The most common job settings for NPs and PAs in LTC and organizations focused on care for older and disabled populations were traditional settings such as LTC facilities (39%) and home care (28%) (Figure 4). We were surprised to discover that 11% of job postings described LTC work in multiple settings. Job postings located in multiple settings included geriatric clinical positions that also required house calls, and patient care in LTC facilities coupled with hospital rounds of facility residents admitted to the hospital. Job postings in ambulatory care and hospital-based settings were much less common than positions in LTC facilities and home care (10% in ambulatory care and 3% in hospital-based settings). One example of an ambulatory care position included in our analysis was a job posting for an NP in a gerontology clinic. A hospital-based position for an orthopedic surgery PA exclusively serving patients age >65 years is an example of a hospital-based position included in our analysis.

Figure 4. Distribution by Setting of Combined NP/PA Job Openings for LTC and Care of Elders/People with Disabilities: 2014 Data



Source: Proprietary data from Burning Glass Technologies, 2014
Notes: Sample size = 11,099 job postings in geriatric and chronically disabled care

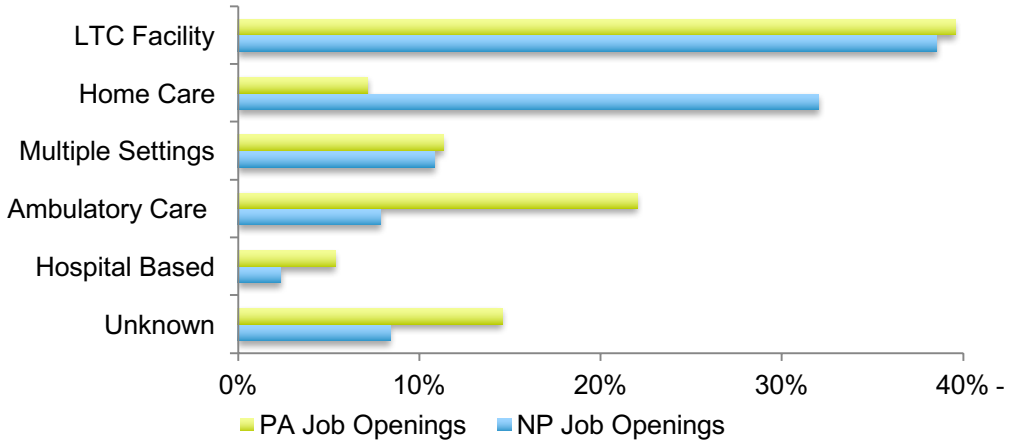
The vast majority (74%) of job openings in LTC facilities did not provide detail about the type of LTC facility and we coded these as general LTC facilities. Among the LTC job postings that specified a setting, the most common were skilled nursing facilities (6%), nursing homes (5.4%), post-acute care and rehabilitation facilities dedicated to geriatric or disabled populations (5.1% for post-acute and 4.7% for rehabilitation), transitional care (2.4%), with <1% of postings for each of assisted living, retirement communities, residential continuing care facilities, and supported living.

As shown in Figure 5 some differences across settings emerged in employer demand for NPs versus PAs. Employer demand was relatively similar for NPs and PAs in LTC facilities. Conversely home care job postings were much more common for NPs (32%) than for PAs (7%). In addition, clinic-based positions were less commonly posted for NPs (8%) than for PAs (22%). We were unable to determine the setting for 8% of NP jobs openings and 15% of PA openings. Our analysis of real time labor market data indicates that the employment market for positions in LTC and care for older and disabled populations is strong for both NPs and PAs, and NPs are in higher demand than PAs in this market.

SAMPLE JOB DESCRIPTION FOR MULTIPLE SETTINGS

Position Summary: The Nurse Practitioner (NP) acts as part of the clinical operations team and may be providing direct patient care in nursing homes, skilled nursing facilities (SNF) and home settings depending on the nature of the assignment or providing assessments to members in skilled nursing facilities and home settings. The responsibilities may include: geriatric assessment, medical history, physical exam, diagnosis and treatment, health education, physician referrals, case management referrals, follow-up and clear documentation.

Figure 5. Distribution by Setting of Disaggregated NP and PA Job Openings for LTC and Care of Elders/People with Disabilities: 2014 Data

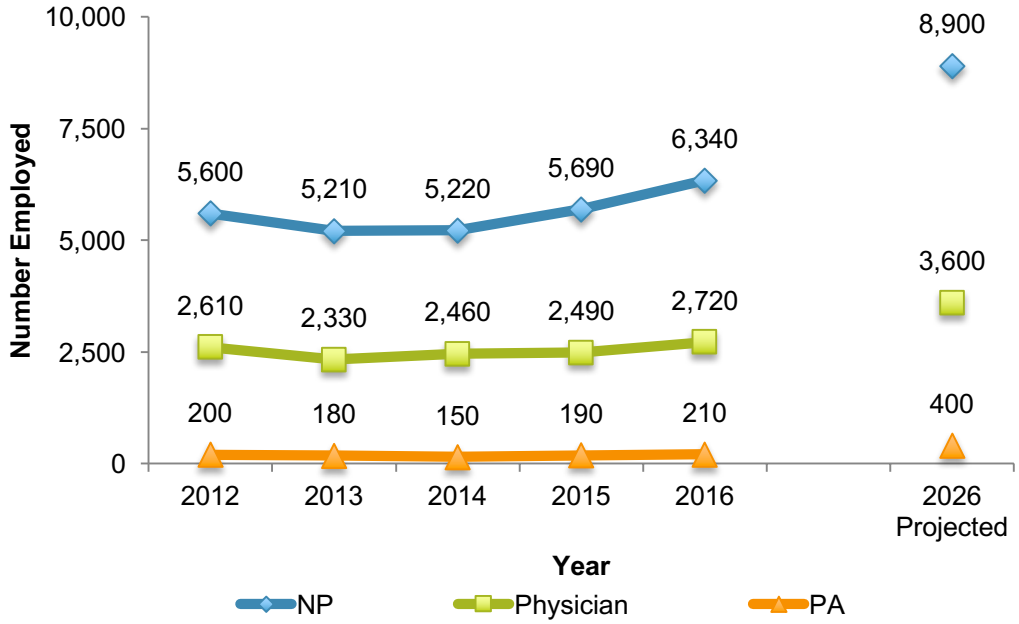


Source: Proprietary data from Burning Glass Technologies, 2014
Notes: Sample size = 11,099 job postings in geriatric and chronically disabled care

Comparison of Job Postings with Occupied Positions

We compared our findings regarding job openings with BLS data for existing employment of NPs and PAs. The BLS tracks employment by practice setting, with LTC settings including nursing and residential care facilities and home healthcare. The BLS data reveal that the vast majority (97%) of occupied positions in home health and nursing and residential care facilities were held by NPs rather than PAs, which is consistent with the pattern in the job posting data.[32] According to BLS estimates, 5,220 NPs and 150 PAs were employed in LTC and home health settings in 2014. Since the BLS began reporting occupation data by LTC settings for physicians, NPs, and PAs in 2012, NPs have comprised the majority of the clinician workforce in LTC settings (Figure 6). The number of physicians, NPs, and PAs in LTC settings has increased since 2014 and is projected to continue to rise through 2026.

Figure 6. Number of Physicians, NPs, and PAs employed in Nursing and Residential Care Facilities and Home Healthcare from 2012 to 2016



Source: Bureau of Labor Statistics, 2014-2024 and 2016-2026 Industry-Occupation Matrices[33,34]
Notes: Excludes administrative, educational, and governmental positions. Occupation codes for physicians (29-160), NPs (29-1171), and PAs (29-1071). Setting codes for nursing and residential care facilities (NAICS 623000) and home healthcare services (NAICS 621600). Residential intellectual and developmental disability facilities are reported along with mental health and substance abuse facilities (NAICS 623200) and cannot be separated, so we excluded this subgroup from the overall category of nursing and residential care facilities to avoid including mental health and substance abuse facilities in our analysis.

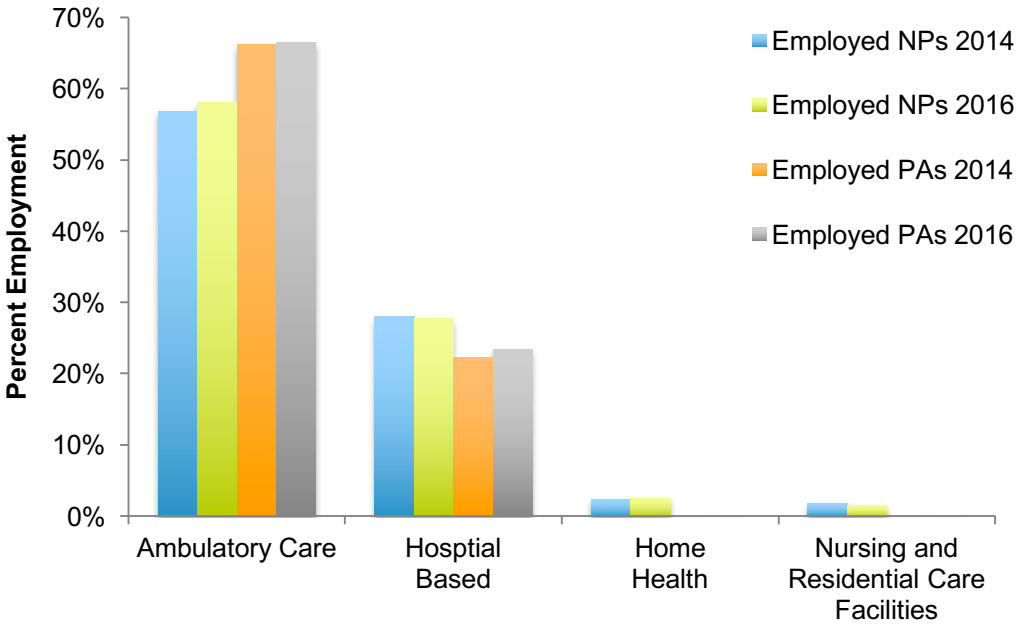
Similar to our findings on job openings, the BLS reports that small percentages of NPs and PAs are employed in long-term care settings compared with ambulatory care and hospital-based settings. As seen in Figure 7, in 2014 only 2.4% of NPs and 0.1% of PAs were employed in home healthcare services, and only 2% of NPs and 0.1% of PAs worked in nursing and residential care facilities. The percentage of the workforce in these long-term care settings remained relatively constant between 2014 and 2016.

BLS reports home health as a subset of ambulatory care. For this analysis of LTC we separated home health data out of the ambulatory care category.

The BLS projects employment growth for both NPs and PAs in long-term care settings over the next decade. As seen in Table 2, employment in home healthcare jobs is predicted to nearly double for both NPs and PAs by 2026.

Nursing and residential care facilities are predicted to have more modest growth in employment of NPs (9%) and PAs (14%). Employment of NPs and PAs in ambulatory and hospital-based settings that focus on care of older and/or disabled populations cannot be identified in BLS data because specialty data are not reported for NPs and PAs.

Figure 7. Employment Distribution of All NPs and PAs by Setting, 2014-2016



Source: Bureau of Labor Statistics, 2014-2024 and 2016-2026 Industry-Occupation Matrices[33,34]
Notes: Excludes administrative, educational, and governmental positions.

Table 2. Projected Percent Change in Employment of NPs and PAs from 2016-2026

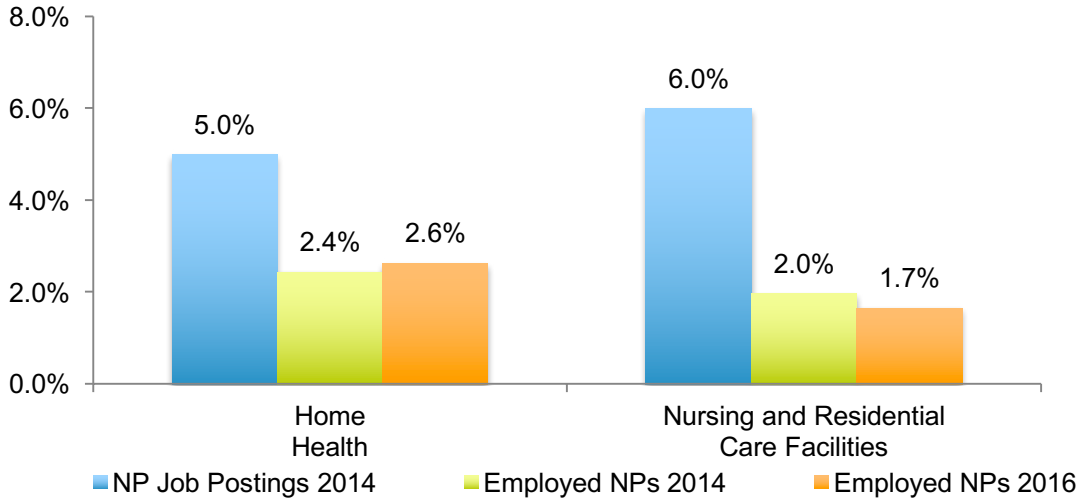
	Home Health	**Nursing and Residential Care Facilities**
Nurse Practitioner	48.6%	9.0%
Physician Assistant	48.6%	14.3%

Source: Bureau of Labor Statistics, 2016-2026 Industry-Occupation Matrices[33,34]
Notes: Excludes administrative, educational, and governmental positions.

BLS reports home health as a subset of ambulatory care. For this analysis of LTC we separated home health data out of the ambulatory care category.

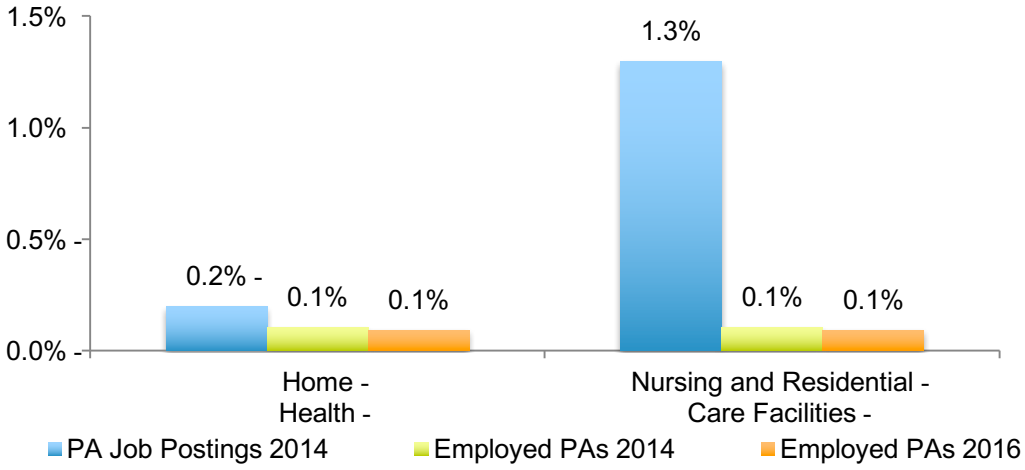
A comparison of current employment of NPs and PAs to posted job openings can provide information about whether there is growing demand. If job postings within a specific setting are a greater share of all postings than the current share of employment in that setting, then we expect growth in the proportion of people employed in that setting over time. As seen in Figure 8, 5% of job postings for NPs in 2014 were in home healthcare and only 2.4% of employed NPs were working in home healthcare that year. In that year, 6% of job postings for NPs and 1.3% of postings for PAs were in nursing and residential care facilities, while only 2% of NPs and 0.1% of PAs worked in those settings. Together, these data indicate growing employment of NPs in home health, and of both NPs and PAs in nursing and residential care. We did not find a large difference between the share of PA job postings in home health (0.2%) and the share of PAs working in home health in 2014 (0.1%), suggesting that PA employment in this setting is not rising.

Figure 8. Comparison of NP Job Postings in 2014 with Employed NPs in Home Health and Nursing and Residential Care Facilities in 2014 and 2016



Source: NP job postings 2014 from proprietary data from Burning Glass Technologies. Employed NPs 2014 from Bureau of Labor Statistics, 2014-2024 Industry-Occupation Matrices. Employed NPs 2016 from Bureau of Labor Statistics, 2016-2026 Industry-Occupation Matrices.
Notes: Percentages are percent of total job postings for NPs in 2014 and percent of total employed NPs in 2014 and 2016.

Figure 9. Comparison of PA Job Postings in 2014 with Employed PAs in Home Health and Nursing and Residential Care Facilities in 2014 and 2016



Source: PA job postings 2014 from proprietary data from Burning Glass Technologies. Employed PAs 2014 from Bureau of Labor Statistics, 2014-2024 Industry-Occupation Matrices. Employed PAs2016 from Bureau of Labor Statistics, 2016-2026 Industry-Occupation Matrices.
Notes: Percentages are percent of total job postings for PAs in 2014 and percent of total employed PAs in 2014 and 2016.

Limitations

Limitations of job posting data from BGT include the inability to identify positions that were not posted online, potential for duplication in the dataset of jobs posted more than 60 days, and job postings that may represent more than one open position. Our treatment of the data introduced the potential for coding errors. A rigorous coding and validation process was undertaken by our team to minimize such errors.

A major drawback of working with real-time labor market data is the time required to manually read and code individual job descriptions. We estimate that our coding time was 1-3 minutes per post, depending on length and clarity of the description. Applying machine learning methods to code jobs could expedite this process, but this requires that enough postings be manually coded to provide a "gold standard" against which machine learning algorithms can be calibrated. Future research should refine these methods with labor market data to improve accuracy.

Finally, job postings are a proxy for the job market but do not represent actual positions filled and our results must be interpreted with this limitation in mind.

Conclusions

Our study is the first to examine employer demand for NPs and PAs in the long-term care and care of elders/people with disabilities sector and presents a benchmark by which to monitor future changes in demand for clinicians caring for aging and chronically disabled populations. Our findings illuminate strategies for educators, employers, and policymakers to bolster workforce in this sector. Given the high employer demand for NPs and PAs in LTC in 2014, educators should develop curricula that prepare NPs and PAs for careers in care of elders and people with disabilities. Even brief, targeted exposures to geriatric and long-term care patients during training have been shown to improve students' knowledge and preparation for these careers.[35]

While job opportunities abound for NPs to care for older and geriatric populations, we have identified the lack of job availability for PAs as a potential barrier to entry. Employers may not fully understand PA education and how PAs are prepared to fill employment gaps for geriatric and disabled populations. NPs often have specific course content in gerontology and geriatrics, and most NPs focus on ambulatory care during their education. PAs also have education in these areas, as well as in surgery and other hospital-based and specialty fields. Employer demand for both NPs and PAs

in specialty care is considerably higher than for primary care, and market forces alone are not likely to reverse this trend.

Given that NPs comprise a larger percentage of the home health and nursing and residential care facility clinician workforce than physicians, policymakers should consider the impact of restrictive scope of practice legislation on access to care for aging and chronically disabled constituents. Educators, employers, and policymakers must work together to strengthen the health workforce and improve healthcare access for aging and chronically disabled populations.

Acronyms in this Report

BGT: Burning Glass Technologies, Inc.

BLS: Bureau of Labor Statistics

LTC: Long-Term Care

ML: Machine Learning

NP: Nurse Practitioner

PA: Physician Assistant

SNF: Skilled Nursing Facility

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Technical Appendix

BLS Data Use Details

BLS methodology aims to count active clinicians and excludes administrative, educational, and governmental positions. We analyzed the occupation codes for physicians (29-160), NPs (29-1171), and PAs (29-1071). Within each occupation, we analyzed the setting codes for nursing and residential care facilities (NAICS 623000) and home health care services (NAICS 621600). Residential intellectual and developmental disability facilities are reported along with mental health and substance abuse facilities (NAICS 623200) and cannot be separated, so we subtracted this subgroup from the overall category of nursing and residential care facilities to avoid including mental health and substance abuse facilities in our analysis.

Miscoded Postings

Our analysis was also limited by our ability to determine whether job postings were for LTC and geriatric/disability care positions based on job descriptions. We found discrepancies between our automated versus manual coding of LTC job postings. Our automated process overestimated the number of LTC job postings for NPs and PAs by 45% relative to the manual coding process. Manual coding of jobs revealed three reasons for overestimation.

1. The majority of the error resulted from Type II error; job openings coded as LTC that were not actually LTC. Most commonly, jobs were identified by the automated process because one or more of the search terms were included in the job description as part of the suite of services offered by the employer. For example, "…health system includes a hospital, outpatient clinics, a rehabilitation facility, and long-term care facilities…" Benefits offered by the employer presented another source of error. For example, many job posting mentioned "retirement" options/plans for the position rather than referring to retirement communities. In our preliminary manual coding phase, we identified full search terms that were embedded within common language used in job postings. For example, "aging" is part of the word "managing" and "imaging."

2. Some job postings clearly described positions working with geriatric populations and others were difficult to decipher. For example, some postings contained the following language: "Improve Your Quality of

Life While Helping Seniors!...The Home Assessment program offers the opportunity to complete a full history and physical assessment for patients in the comfort of their own home during a single visit…Geriatric or adult medicine specialty a plus…Must be able to effectively communicate with elderly and chronically ill patients and families." Other job postings were less descriptive about the type of work and population served. For example, "as a visiting provider, we afford you with every resource to give patients the best possible care in their home…we offer a full continuum of home based care services to support our nurse practitioners to ensure our patients receive the comprehensive care they need, when they need it…experience in geriatrics preferred, but not required."

3. The term "rehabilitation" was another source of miscoding between the automated and manual process. Frequently, job postings that included the term rehabilitation referred to rehabilitation for acute disability or substance abuse and were excluded from our definition of LTC job postings. For example, "alcohol and drug addiction treatment center was created to provide those persons suffering from drug addiction, alcoholism, and dual disorders with a suitable drug rehabilitation environment" was not counted as a LTC job posting. In another example, "the candidate should have an interest in caring for patients utilizing a Rehabilitation approach for chronic and acute injuries" was also excluded from the LTC count. Future analyses should consider removing the term rehabilitation from the automated algorithm, as it rarely identified true LTC positions.

Miscoded Professions

Despite the initial data cleaning process, manual coding revealed 7.5% of job openings were not for NPs or PAs. A common reason for automated miscoding was due to job postings for clinical nurse specialists or other Advanced Practice Registered Nurse roles where the job does not include diagnosis, treatment, and prescribing. Others miscoded job postings were for physicians, chronic disease managers, and care coordination roles. Consistent with other reports on BGT data, we found less than 1% of NP and PA job postings were for faculty or administrative roles.