ABOUT THIS REPORT

This report provides quantitative data and analysis on Arizona’s current and projected health-care workforce. The report supplements the Enterprise Executive Committee (EEC) at-risk assignment delivered in August outlining results of university and industry stakeholder interviews regarding university health science assets and Arizona workforce needs.

The Seidman Research Institute at Arizona State University developed the underlying data analysis and estimates of how Arizona’s universities meet the state’s projected health professional workforce needs cited in this report. Their full analysis can be found here.

ABOUT THE ARIZONA BOARD OF REGENTS

The Arizona Board of Regents is committed to ensuring access for qualified residents of Arizona to undergraduate and graduate institutions; promoting the discovery, application and dissemination of new knowledge; extending the benefits of university activities to Arizona’s citizens outside the university; and maximizing the benefits derived from the state’s investment in education.

MEMBERS
Lyndel Manson, Chair
Fred DuVal, Chair Elect
Cecilia Mata, Secretary
Larry E. Penley, Treasurer
Robert J. Herbold
Jessica Pacheco
Doug Goodyear
Gregg Brewster
Rachel Kanyur, Student Regent
Katelyn Rees, Student Regent
Gov. Doug Ducey Ex-Officio
Superintendent Kathy Hoffman, Ex-Officio

ABOR EXECUTIVE DIRECTOR
John Arnold

September 27, 2022
TABLE OF CONTENTS

1  Summary and Key Findings

3  Introduction

3  Methodology

6  Health-Care Workforce Gap Analysis

13  Turnover and Worker In-Migration

14  Annual Variations in New Jobs and Worker Production

15  Results by Profession

23  Conclusion
SUMMARY AND KEY FINDINGS

This report is divided into four parts. First, it provides an analysis of Arizona’s current health professional workforce shortage. The analysis reviews 20 health occupations comparing Arizona’s professional to population ratios to national averages.

Second, the report reviews projected ten-year job growth (through 2032) in the identified health-care professions versus a projection of the number of workers qualified for employment in each of the occupations who are graduates of Arizona higher education institutions and work in Arizona. This section of the report attempts to answer whether current higher education workforce production will reduce existing health-care worker shortages over the next decade.

Third, the report addresses how this analysis is impacted by unknowns involving worker in-migration and health-care workforce turnover rates.

Finally, the report reviews variations in annual demands and closely reviews each of the identified health occupations.

Data in this report, together with community and industry interviews, support the general consensus that Arizona is experiencing health professional shortages. This report adds to that conversation by detailing which professions are experiencing the most extreme shortfalls and compares those shortfalls against planned academic program expansions. Arizona’s universities should continue to consider strategies to increase needed degree production and program improvements that may help eliminate the state’s health workforce shortfalls.

Report conclusions include:

• Arizona’s worker to population ratio is below the national average for all professions except for pharmacists and chiropractors.

• Annual growth in all health-care professions over the next decade is projected to moderate. Slowing growth, combined with planned or implemented program expansions, will allow some professions to narrow existing gaps.

• Arizona’s public universities’ share of degree production varies significantly between identified occupations. Understanding market shares will improve investment decisions and should drive production related partnerships.

• Worker in-migration, turnover rates and industry changes include unknown variables that limit the board’s ability to predict workforce needs.

• Expanded university partnerships with industry leaders have the potential to strengthen Arizona’s health-care workforce beyond providing additional degrees. Possible additional partnerships include programs to better prepare health-care professionals for employment challenges or developing innovative programs to improve rural Arizonans’ access to care.
• Interviews and external data indicate Arizona’s rural counties experience greater challenges recruiting and retaining health-care workers. These areas may face workforce shortages even in professions where statewide data indicates sufficient supply.

• Mental health worker demand is understated because the shortage is so severe that health-care providers are not advertising for the positions.

• Arizona’s existing health-care infrastructure may not support a significantly increased worker supply without additional investments. (e.g., adding additional hospital beds where needed). Universities should coordinate program expansion with industry efforts to expand infrastructure.
INTRODUCTION

With a documented health professional workforce shortage in Arizona, many residents across the state are experiencing significant challenges obtaining access to health-care providers at all levels from nursing to dieticians and nutritionists to physicians.¹ These shortages are confirmed by data comparing Arizona’s professional to population ratios to national averages.

This report analyzes 20 health-related occupations and provides:

• Data on Arizona’s health professional worker to population ratios compared to national figures.

• Projected annual health-care job changes within Arizona compared to the annual number of new Arizona university graduates expected to meet the state’s growth in demand.

Current and future workforce need estimates, complemented by the August report’s interview results detailing where universities made - or plan to make - new investments to support Arizona’s workforce, illuminate potential opportunities for additional expansions.

METHODOLOGY AND DATA LIMITATIONS

The report uses three main sets of data. Data from the Health Resources and Services Administration (HRSA) details the existing Arizona workforce, and for future projections, employment change forecasts and degree completions and retention. As noted in more detail in the Seidman Report, the report uses existing forecasts of employment changes and compares the projected number of retained completions to the projected employment change by occupation. The report includes a range based on the retention rate, using an average along with high and low bands (based on one standard deviation from the average).

HRSA Data Provides Context on Magnitude of Existing Shortages

HRSA publishes Area Health Resources Files, which are available for health professions by state, and are used to develop estimates of the existing health professional workforce, including how Arizona’s worker to population ratio compares to national figures. This data provides context on the magnitude of existing workforce shortages by specific profession.

Employment Change Forecasts Include Annual and 10-Year Projections

The forecast analysis employs two sets of employment projections by occupation: Arizona Office of Economic Opportunity (OEO) and Lightcast.

OEO, part of the Arizona Commerce Authority, produces a 10-year forecast of employment by industry and occupation, including self-employed and wage and salary workers. OEO data does not provide annual figures and publishes limited county data.

Lightcast (www.economicmodeling.com) is a private-sector company that provides labor force and related data. The Lightcast data includes the annual and 10-year forecasts with detailed county specific data.

As is typical in economic modeling, forecast results vary significantly based on input data and modeling assumptions; these two projections produce considerably different forecasts in employment. The Seidman Report provides more detail about the data sources and differing results using both data sets. This report used the Lightcast data as it: allows for annual modeling, enabling a more dynamic understanding of industry trends; is slightly more consistent with other industry sources; has fewer missing data sets; and is more up to date.

Degree Completions and Workforce Retention

As part of the interviews for the August Report, ABOR staff interviewed 70 individuals representing 33 programs across Arizona’s public universities. Staff requested data including 2020-21 applications, admissions, matriculations, graduations (completions) and pass rates for programs requiring a national or state licensure exam. Staff compared this data to data in the Fiscal Year 2022 ABOR College Completion Report, as well as forecasts of new programs and/or changes in student cohorts gathered from interviews and materials provided to ABOR. For private institutions, data was accessed from institutions’ websites where available. A combination of data from 2020 IPEDS and relevant state licensure boards supplemented this data. For community colleges, 2020 IPEDS completions and published exam pass rates were used. Program websites provided information about planned expansions.

Because only a portion of graduates will become employed in Arizona, completions data was adjusted by an estimated retention rate. Seidman used the ABOR Alumni Wages Report and the U.S. Census Bureau’s Postsecondary Employment Outcomes to develop retention rate estimates using five years of data for most professions. For professions without sufficient data, estimates were fully imputed. Due to significantly limited data available to estimate retention rates by occupation, Seidman calculated a range of retention rates, producing the gap analysis range of calculations.

Additional detail on the methodology is available in the Seidman Report.

Data Context and Limitations

Other important context regarding the data used in this report includes:

- The HRSA data and Seidman analysis provide point-in-time estimates of the workforce and do not adjust for any potential changes in the underlying workforce (e.g., accounting for differences in turnover rates) or transformations in how health care is delivered (e.g., technology advancements that impact demand for workers).
• While the study uses the best data available for retention rates, data limitations may not provide a full picture of occupational departures and may overstate future employment in some professions:

• It includes workers who become employed in any profession in Arizona in the first year after graduation (not whether the graduates work in their degree field or whether they stay in the state without working).

• Data does not address underlying turnover (i.e., workers leaving the profession) and assumes migration will keep supply and demand reasonably balanced.

• The dataset includes only the three public universities and matches only to jobs covered by the unemployment insurance program.

• To address retention rate uncertainty, the report provides ranges that are calculated using five years of retention data. The middle scenario uses the average of those numbers, and the upper and lower bounds of the range are based on one standard deviation from the average. Given limited data, some professions exhibit significant range.

• County level data is significantly limited. Therefore, this report does not quantify the distribution by profession of workers across Arizona’s counties. However, interviews and other data sources clearly demonstrate that rural counties have significantly lower provider to population ratios than non-rural counties. Therefore, even in areas where the supply of newly graduated workers appears to exceed projected job growth, certain locations will likely still experience an undersupply.

• Ten-year forecasts are inherently limited given the uncertainty of future markets and economic conditions. Many factors may impact the future supply and demand for Arizona health-care professionals such as future degree program expansions, less Arizona in-migration or health-care delivery changes.

• The Seidman Report includes additional scenarios not described in this report. Therefore, professional groupings and interpretation of results may differ between the two reports.

---

2 For more information see Enterprise Executive Committee 2021-2022 Annual At-Risk Compensation Assignment #2 – Health Sciences Report at https://public.azregents.edu/News%20Clips%20Docs/HealthSciences_Aug2022_FINAL.pdf
HEALTH-CARE WORKFORCE GAP ANALYSIS

The gap analysis used HRSA data to estimate the number of additional health-care workers Arizona needs to achieve worker to population ratios equal to the national average, as well as the share of the existing health-care workforce that the estimated needed increase represents. In addition, Seidman data informed future job growth projections in almost every health profession for the next decade and provided context on how Arizona’s public universities will support workforce demand by producing health-care degrees. The analysis indicates an at times significant gap between Arizona’s current health-care workforce needs and the current supply of trained workers. By 2032, Arizona’s health-care workforce annual needs imbalance is projected to narrow in many fields, but overall workforce status depends on the extent to which the imbalance and turnover rates are addressed or remediated.

Arizona’s Health-Care Infrastructure and Workforce is Below the National Average

Arizona’s health-care infrastructure faces pressure from the state’s steadily growing population and lags the nation. Arizona has fewer hospital beds per 1,000 population than the national average (1.99 to 2.38 respectively). Public health funding is 50 percent below the national average, ranking Arizona 47th among states.

Except for pharmacists and chiropractors, Arizona ranks below the national average for health-care workers. By volume, nurses exhibit the greatest shortage, but other professions such as physicians, social workers and physical therapists also are in short supply.

Figures 1 and 2 display Arizona’s health worker to population ratios compared to the 50-state average by profession. Figure 1 outlines the number of additional professionals needed to reach the national average. Figure 2 displays that gap as a percent of each profession’s 2022 workforce, providing context to the magnitude of Arizona’s shortages. Arizona currently is experiencing shortages in almost every health-care profession.

1 Number of hospital beds, doctors in Arizona are low compared with rest of U.S. (azcentral.com)
2 Kaiser Family Foundation, State Health Facts: Hospital Beds per 1,000 Population by Ownership Type | KFF, accessed August 26, 2022.
4 Data was not available for certain professions included in this report, but the professions are included in these figures (with null signs) for consistency with the rest of the report.
Figure 1. Shortfall of professionals needed to reach national average worker to population ratio, by profession

Figure 2. Professional shortfall compared to national average ratios as shown in Figure 1 as share of existing 2022 workforce by profession
As highlighted in the August EEC report, community and program interviews support the data analysis’ finding that Arizona has underlying health-care workforce shortages.

Arizona’s universities have an opportunity to increase degree production to meet the existing undersupply of workers, but before encouraging academic program expansion the board should consider:

- Arizona’s underdeveloped health-care infrastructure may not support national average worker to population ratios and less university investment may be needed than figures indicate. In conjunction with any program enhancement or investment, the universities should engage industry leaders in collaborative conversations about opportunities to enhance health-care infrastructure in the state.

- Community interviews indicate nursing and other health professions are experiencing significant turnover. Those changes, and any ongoing turnover, are not reflected in these point-in-time estimates and may result in underestimating future worker needs.

**CLOSING THE GAP: FUTURE CHANGES IN WORKFORCE NEEDS AND DEGREE PRODUCTION**

The gap analysis by profession employed health-care professional job growth and retained degree completions. This analysis provides context for evaluating opportunities for higher educational investment in programs that support Arizona’s health-care workforce. Workforce data projections are combined with completions data for current and projected graduates to provide a forward-looking perspective of Arizona’s health professional job growth from 2022 to 2032. The analysis provides both an annual and 10-year basis.

**Anticipated Job Growth Show Increases in Most Health-Care Jobs**

Projections show Arizona job growth in almost every health profession over the next decade. Figure 3 illustrates an updated version of Seidman’s forecast of Arizona health-care jobs. Nurse practitioners and anesthetists, marriage and family therapists, genetic counselors and physician assistants all have relatively low volume but are expected to see high proportional growth in the next decade.

Registered nurses, on the other hand, have the largest workforce, but expected growth will be moderate - 3.1 percent in 2022 and 1.5 percent in 2032. For all professions, the growth figures reflect Lightcast’s forecasted slowing of annual employment increases between 2022 and 2032 (i.e., the annual growth rate in 2023 is lower than the 2022 annual growth rate for all professions detailed).
Figure 3. Projected health professional jobs in 2022 and 2032 with corresponding annual growth rates

Figure 4 presents a 10-year “gap analysis” between expected individuals receiving degrees in the highlighted professions and working in Arizona to forecasted job changes in those same fields, both totaled over the same 10-year period with an upper and lower estimated range. In Figure 4, a value of one for the ratio indicates that the annual new supply of degreed professionals working in Arizona (retained production) and the change in demand for those professions are in balance. Simply put, new graduates working in Arizona are sufficient to fill the expected job growth in their field.

Values greater than one indicate professions for which 10-year retained production exceeds projected 10-year annual job growth. This may demonstrate that projected degree production is sufficient to meet projected changes in demand (all else being equal and the underlying workforce being sufficient). Values less than one indicate professions for which 10-year retained production is less than projected 10-year annual job growth. This demonstrates that projected demand may need additional production. No institution located in Arizona produces chiropractors; thus, the ratio is zero.

In Figure 4, all the professions show significant range in forecast results. Eight out of 20 professions (including chiropractors) show an average annual retained production less than the projected annual
job growth while 11 show average annual production exceeding annual job growth. (Speech-language pathologists show annual growth and production exactly balanced.)

Figure 4. 10-year total gap analysis as a ratio to 10-year job changes from 2022-2032 with upper/lower range estimates

Table 1 below groups the professions by results:

<table>
<thead>
<tr>
<th>Table 1. Gap Analysis Results by Profession</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Annual Production Exceeds Annual Job Growth – Entire Range</strong></td>
</tr>
<tr>
<td>Registered Nurses</td>
</tr>
<tr>
<td>Physician Assistants</td>
</tr>
<tr>
<td>Social Workers</td>
</tr>
<tr>
<td>Audiologists</td>
</tr>
<tr>
<td>Pharmacists</td>
</tr>
<tr>
<td>Dentists</td>
</tr>
<tr>
<td>Dietitians &amp; Nutritionists</td>
</tr>
<tr>
<td>Genetic Counselors</td>
</tr>
<tr>
<td>Chiropractors</td>
</tr>
<tr>
<td>Dentists</td>
</tr>
<tr>
<td>Dietitians &amp; Nutritionists</td>
</tr>
</tbody>
</table>

*Currently, there are no higher education programs (public or private) in Arizona that offer a chiropractic degree. Thus, all practicing chiropractors are imported.*
Table 2 presents a cumulative overall summary of projected 2032 worker gaps combining current shortfalls with the total projected 10-year market change. This table just compares projected job growth to Arizona university production and does not include external impacts such as in-migration and employee turnover.

Table 2. Select Worker Supply and Demand Information by Profession

<table>
<thead>
<tr>
<th>Occupation</th>
<th>2022 Job Base</th>
<th>Number of Jobs Needed to Meet National Average Worker to Population Ratios in 2022</th>
<th>Projected Change in Jobs Between 2022-2032</th>
<th>Total Needed Jobs to Meet National Average (existing shortage plus projected change in jobs)</th>
<th>Projected Arizona Retained Completions (2022-2032)</th>
<th>2032 Gap (Jobs Needed to Meet National Average Minus Retained Completions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Registered nurses</td>
<td>58,914</td>
<td>14,291</td>
<td>13,161</td>
<td>27,452</td>
<td>22,773</td>
<td>(4,679)</td>
</tr>
<tr>
<td>Nurse Practitioners (incl. Nurse Anesthetists)</td>
<td>5,933</td>
<td>560</td>
<td>3,362</td>
<td>3,922</td>
<td>3,510</td>
<td>(412)</td>
</tr>
<tr>
<td>Physicians (All Specialties)</td>
<td>10,025</td>
<td>3,644</td>
<td>3,413</td>
<td>7,057</td>
<td>2,926</td>
<td>(4,131)</td>
</tr>
<tr>
<td>Physician Assistants</td>
<td>2,892</td>
<td>578</td>
<td>1,208</td>
<td>1,786</td>
<td>2,886</td>
<td>1,100</td>
</tr>
<tr>
<td>Clinical, Counseling, &amp; School Psychologists</td>
<td>2,857</td>
<td>849</td>
<td>591</td>
<td>1,440</td>
<td>319</td>
<td>(1,121)</td>
</tr>
<tr>
<td>Counselors (Substance, Behav, Mental, Rehab)</td>
<td>9,926</td>
<td>NA</td>
<td>3,137</td>
<td>3,137</td>
<td>2,917</td>
<td>(220)</td>
</tr>
<tr>
<td>Marriage &amp; Family Therapists</td>
<td>1,065</td>
<td>NA</td>
<td>496</td>
<td>496</td>
<td>124</td>
<td>(372)</td>
</tr>
<tr>
<td>Social Workers (Substance, Mental, Healthcare)</td>
<td>7,137</td>
<td>2,419</td>
<td>1,924</td>
<td>4,343</td>
<td>3,475</td>
<td>(868)</td>
</tr>
<tr>
<td>Occupational Therapists</td>
<td>2,461</td>
<td>871</td>
<td>791</td>
<td>1,662</td>
<td>1,651</td>
<td>(11)</td>
</tr>
<tr>
<td>Physical Therapists</td>
<td>4,367</td>
<td>988</td>
<td>1,546</td>
<td>2,534</td>
<td>2,260</td>
<td>(274)</td>
</tr>
<tr>
<td>Speech-Language Pathologists</td>
<td>3,048</td>
<td>393</td>
<td>1,163</td>
<td>1,556</td>
<td>1,159</td>
<td>(397)</td>
</tr>
<tr>
<td>Audiologists</td>
<td>176</td>
<td>NA</td>
<td>66</td>
<td>66</td>
<td>125</td>
<td>59</td>
</tr>
</tbody>
</table>
### Occupations (continued)

<table>
<thead>
<tr>
<th>Occupations</th>
<th>2022 Job Base</th>
<th>Number of Jobs Needed to Meet National Average Worker to Population Ratios in 2022</th>
<th>Projected Change in Jobs Between 2022-2032</th>
<th>Total Needed Jobs to Meet National Average (existing shortage plus projected change in jobs)</th>
<th>Projected Arizona Retained Completions (2022-2032)</th>
<th>2032 Gap (Jobs Needed to Meet National Average Minus Retained Completions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pharmacists</td>
<td>8,595</td>
<td>(289)</td>
<td>1,079</td>
<td>790</td>
<td>2,037</td>
<td>1,247</td>
</tr>
<tr>
<td>Optometrists</td>
<td>1,273</td>
<td>233</td>
<td>332</td>
<td>565</td>
<td>272</td>
<td>(293)</td>
</tr>
<tr>
<td>Chiropractors</td>
<td>1,065</td>
<td>(13)</td>
<td>187</td>
<td>174</td>
<td>-</td>
<td>(174)</td>
</tr>
<tr>
<td>Podiatrists</td>
<td>397</td>
<td>NA</td>
<td>88</td>
<td>88</td>
<td>101</td>
<td>13</td>
</tr>
<tr>
<td>Dentists (All Specialties)</td>
<td>3,697</td>
<td>206</td>
<td>804</td>
<td>1,010</td>
<td>1,069</td>
<td>59</td>
</tr>
<tr>
<td>Dental Hygienists</td>
<td>4,349</td>
<td>1,120</td>
<td>1,152</td>
<td>2,272</td>
<td>976</td>
<td>(1,296)</td>
</tr>
<tr>
<td>Dietitians &amp; Nutritionists</td>
<td>1,767</td>
<td>503</td>
<td>391</td>
<td>894</td>
<td>242</td>
<td>(652)</td>
</tr>
<tr>
<td>Genetic Counselors</td>
<td>46</td>
<td>NA</td>
<td>22</td>
<td>22</td>
<td>45</td>
<td>23</td>
</tr>
</tbody>
</table>

### ABOR Market Share of Health-Care Professionals Significant in Arizona

The share of annual newly degreed professionals retained in Arizona’s workforce also provides necessary context when evaluating changes in degree production. The extent to which Arizona’s public universities can move the needle on overall market balance depends on their proportional share of the supply pipeline, as well as if the universities are the only entities able to provide the health-care workforce supply.

As shown in Figure 5, this “ABOR market share” compared to other higher education institutions offering health-care programs within Arizona varies significantly across professions. Nurses, counselors and dental hygienists exhibit the lowest share of total degrees coming from the public universities. This information viewed in the context of the data and interview findings can inform strategy considerations. For example, professions such as nursing where there is currently a shortage and where the universities make up a small share of completions may require more comprehensive and collective program investment strategies to make a significant difference in workforce supply. Strategies could include program expansions and further collaborations with employers to ensure graduates are well-prepared for the workforce and more likely to stay in the profession, thereby balancing the need for new production with increased retention measures.

For several professions, Arizona’s public universities comprise 100 percent of newly graduating professionals: marriage and family therapists; social workers; dieticians and nutritionists; and genetic counselors. Changes in these programs are currently the only Arizona generated option to increase supply. For other professions, there is no degree production from Arizona’s public universities: optometrists, podiatrists and dentists (for which there are private university programs); and chiropractors (for which there is no degree production in Arizona).
TURNOVER AND WORKER IN-MIGRATION

This report provides only limited analysis of how worker in-migration and turnover will impact the identified shortfalls. Over the next ten years, approximately 19,200 people per year with at least a bachelor’s degree will enter Arizona’s economy. Unfortunately, there is currently no data available that projects the percentage of in-migration that relates to health care. Further, other states will continue to recruit heath-care workers from Arizona. There is no existing analysis on the net effect of migration on health-care workforce gaps.

Most health-care professions have relatively high turnover rates. These rates spiked during the pandemic and available data has yet to show if turnover is normalizing. Over the last five years, the average hospital in the United States turned over 95.7 percent of their RN workforce. For purposes of this analysis, unknowns include specific Arizona turnover rates, the rate of workers leaving the profession compared to pursuing other jobs within the profession and whether turnover will stabilize or reverse over the next decade.

While it is impossible to project specifically how turnover will impact Arizona health care needs, when making investment decisions, the board can consider industry specific data that may provide context for the analysis in this report. For example:

- According to the 2020 National Nursing Workforce Survey, the median age of a nurse was 52 and 20 percent planned to retire within the next five years. For example, if 40 percent of Arizona’s current nursing workforce retires between 2022 and 2032, that will increase the shortfall identified in Table 3 by approximately 23,000 nurses, just over double the projected production for that period.

- Conversely, pharmacists have historically lower turnover rates and a national median age of only 41. The gap analysis suggests Arizona will have sufficient pharmacists by 2032 and this is unlikely to be impacted by turnover.

- According to the AMA, the average age of a physician in 2018 was 51.5 with almost 30 percent older than 60 and 11 percent older than 70. Similar to nurses, physician shortfalls could be significantly impacted by retirement driven turnover during the next 10 years.

### ANNUAL VARIATIONS IN NEW JOBS AND WORKER PRODUCTION

While the 10-year estimates provide important context for Arizona’s health professional needs, annual data is critical to university planning as the production is based on annual cohort size.

As noted above, annual production is forecasted to increase between 2022 and 2032, but at a slower rate in the future. At the same time, higher educational institutions have plans to increase the number of graduates during that time in:

- Clinical, counseling and school psychologists (Northern Arizona University)
- Physician assistants (NAU and the University of Arizona)
- Occupational therapists (public and private universities)
- Physical therapist (NAU, UArizona, private universities)
- Pharmacists (private universities)
- Speech-language pathologists (private universities)
- Genetic counselors (Arizona State University)

This increased production combined with the moderating annual job-growth forecasts results in changes in the gap analysis over time. In 2022, 17 out of 20 professions exhibit annual degree production that is less than or equal to expected annual job growth. By 2032, this figure falls to four (meaning 16 out of 20 professions are estimated to produce sufficient annual new graduates to fill expected changes in the total number of jobs). The “Gap Analysis Results by Profession” section at the end of this report provides annual estimates of how degree production compares to job growth for 2022, 2027 and 2032 for each profession.

---

12 Audiologists are expected to decrease due to ASU’s closure of its program.
The analyses provide insight on areas where investment is likely to benefit Arizona’s workforce needs. For professions such as psychologists, marriage and family therapists, and dieticians and nutritionists, the forecasts show that, even given the range of potential retention, the number of new workers produced and likely to stay in Arizona is less than projected annual job growth.

For some professions, the results are mixed, and evaluation of the potential for investment may depend on confidence in the projections and other factors. For example, while current annual job-growth data indicates pharmacist production is below expected job growth, future projections show Arizona will produce more pharmacists than expected new jobs. The HRSA data for pharmacists indicate it is one of few areas where Arizona’s worker to population ratio is above the national average and university interviews indicate that programs are expecting to keep their cohorts at the same levels at least in the near term.

Others, such as nurses, physician assistants, social workers, audiologists, pharmacists and dentists show estimates of annual production that exceed projected annual job growth, suggesting Arizona may experience long-term worker to population ratio improvement in these professions.

Even for professions that show consistent results across the range, other factors may support additional production. For example, as discussed above, university and community interviews demonstrate a need for additional nurses, but the data shows annual nurse production will exceed annual job growth. The nurse demand is driven by an underlying imbalance in the base nursing workforce and turnover in the existing workforce, i.e., not new jobs. The interviews indicated that this imbalance existed before the COVID-19 pandemic and was significantly exacerbated by pandemic pressures.

HEALTH-CARE WORKFORCE JOB GROWTH VERSUS PRODUCED WORKERS BY PROFESSION

The sections present annual analysis results by profession in alphabetical order. The graphics reflect annual supply and demand and do not include data on potential underlying workforce imbalance, although the narrative notes relevant HRSA data on the existing workforce where available.

The analysis displays projections for 2022, 2027 and 2032. The vertical bar indicates the number of annual net new jobs in Arizona filled by new graduates remaining in the state ("Filled") and any gap between annual new jobs and new graduates ("Gap") or the oversupply ("Over"). Whiskers indicate range estimates for the share of graduates joining the Arizona workforce. Table 3 at the end of this section presents the data used in these graphs in table format. The data shown is not cumulative. Each year shown annualized only that year. For example, by 2032 the analysis projects annual production of counselors will finally exceed the annual job growth. However, in 2032, there is still a projected overall shortfall of 220, as seen in Table 2.

13 Alphabetical by the core profession (e.g., Registered Nurses are under N for Nurses).
14 Data that served as the basis for these figures is provided in Table 2 at the end of this section.
Audiologists: Compared to other health professions, annual completions and new jobs in this doctoral-level profession are small. Current production of less than 20 graduates per year is greater than estimated new jobs. This projected overage continues in future years even with an anticipated decrease in graduates. In 2020, Arizona’s public universities awarded 62 percent of the completions. That share is expected to drop to about 43 percent by 2032. ASU’s program closure will decrease public university production by roughly half, leaving the UArizona program within the public universities. One private institution is starting a new program. The FDA recently approved certain types of over-the-counter hearing aids; whether this approval affects future demand for audiologists is uncertain and is not accounted for in these estimates.

Chiropractors: There are no chiropractic schools in Arizona and only 16 throughout the nation. Individuals graduating elsewhere fill any new positions. Despite this lack of in-state production, the HRSA data shows the underlying chiropractic workforce is near the national average in terms of the professional to population ratio.

Counselors (substance abuse, behavioral disorder, mental health and rehabilitation): Counselor occupations typically require a master’s degree. Their combined projected production in Arizona is markedly less than the current projected workforce need, but lower projected annual job growth in the future will result in a job to worker balance. In 2020, Arizona’s public universities awarded one-quarter of the completions, a share that is expected to remain steady through 2032.

Dental hygienists: This occupation includes associate degrees and bachelor’s degrees. HRSA data shows fewer dental hygienists per population than the national average, with the state needing an additional 1,120 dental hygienists to reach the national average - almost three times the total number of hygienists in the entire state. Projected production in Arizona is currently lower than job growth forecasts. Lower projected annual job growth in the future will result in jobs to worker balance. In 2020, most of the production occurred at community colleges with the public university share at NAU awarding approximately one-fourth of completions.
Dentists (including all specialties): Two private universities produce all the dentists that graduate in Arizona; the state’s public institutions do not have doctoral dental programs. HRSA data indicates a shortage in the underlying workforce of about 200 dentists (compared to the national average on a per population basis), or the equivalent of about 20 percent of the state’s dentist workforce. Current production shows a slight gap of workers to new jobs, but future projections show completions greater than the anticipated decreases in new jobs.

Dentists (All Specialties)

Dieticians and nutritionists: Dieticians and nutritionists require master’s degrees. Although the description includes nutrition, many of these positions in the health-care industry are filled by registered dieticians in practice. (Nutrition graduates can become registered dieticians, although most do not.) HRSA data indicates Arizona’s worker to population ratio is significantly below the national average by about 500 professionals, which is almost three times the total of existing workers in the state. The projections show a large current gap and smaller gaps in the future, accounting for lower projected future job growth. The state’s three public universities produce all the completions within Arizona.

Dietitians & Nutritionists

Genetic counselors: This is currently a small but growing profession that requires a master’s degree in these highly competitive programs. Arizona’s public universities award the limited number of completions within Arizona. Given the small number of graduates, projection ranges are wide. Contrary to these estimates, interview responses indicate that a gap is likely in the future as demand for sub-specialties in genetic counseling expands.

Genetic Counselors

Marriage and family therapists: Marriage and family therapists require master’s degrees. Although overall numbers in this profession are relatively small compared to the other groups of behavioral/mental health professions, there is a significant shortfall of Arizona graduates. The gap is projected to continue through 2032. ABOR institutions award all of the limited number of completions.

Marriage & Family Therapists
Registered nurses: Registered nurses are by far the largest health profession. New registered nurses are produced via associate degrees, bachelor’s degrees and master’s degrees. In 2020, Arizona’s public universities awarded 22 percent of the completions, and the public university share of completions is expected to remain steady. Recent state investments are expected to lead to increased completions at public and private institutions. While projections indicate current and future production to be greater than new jobs, interview responses are clear that in practice there is a notable gap in the desired supply of new nurses. The HRSA data support this assertion, indicating that Arizona needs an additional 14,300 nurses (equivalent to 20 percent of the state’s nursing workforce) to reach national average worker to population ratios. According to interview responses, this undersupply is exacerbated by high turnover rates. These rates existed before the COVID-19 pandemic, but were made worse by its pressures, as well as challenges finding instructors to support clinical training.

Nurse practitioners (including nurse anesthetists): Nurse practitioners represent a growing profession where practitioners obtain advanced practice doctoral degrees and master’s degrees in some instances. HRSA data shows Arizona’s profession to population ratio close to the national average. Arizona only needs to add the equivalent of 3 percent of the state’s workforce to reach national worker to population ratios. Future projections are mixed and not markedly far from worker to jobs balance given the uncertainties in the ranges. In 2020, Arizona’s public universities awarded 39 percent of the completions, a market share that is expected to remain steady through 2032.

Occupational therapists: Occupational therapists obtain doctoral degrees as well as master’s degrees. HRSA data shows this population has a worker to population ratio below the national average, requiring an additional 871 practitioners to reach that level (equivalent to 24 percent of Arizona’s workforce). Projections for this occupation indicate that it is currently close to balance in workers to jobs but may see future production that greatly exceeds new jobs. There is considerable uncertainty in projections owing to wide historical variations in the share of occupational therapy graduates remaining in Arizona. Arizona public and private university completions are expected to roughly double in the near future. In 2020, public universities awarded about one-third of completions and that market share will decrease slightly to about one-quarter.
Optometrists: One private university in Arizona produces all doctoral completions; Arizona public universities do not offer optometry programs. HRSA data shows Arizona slightly below the national average worker to population ratio. Future projections are mixed across the full set of scenarios, although the illustrated projections show a current gap that disappears in future years. This is due to decreases in projected new job growth with flat completions.

Pharmacists: The projected production of doctoral-level pharmacists in Arizona shows a current gap. However, HRSA data indicates that pharmacists are one of only two professions in which Arizona’s worker to population ratio is above the national average. Projections also show a significant shift in future years to annual production exceeding new jobs by a large margin. Nationally, pharmacy experienced an over expansion of programs a decade or more ago that may now have moderated. The public university pharmacy program at UA has not currently planned an expansion. In 2020, UA awarded 41 percent of the completions. UA's market share is projected to decline to 30 percent as a new private program begins producing graduates.

Physical therapists: Current HRSA data shows Arizona’s physical therapist to population ratio is below the national average. To reach the national average, Arizona needs almost 1,000 new workers, representing about 32 percent of the existing workforce. Annual projections show a current gap in production that switches to a sizable but highly uncertain overproduction in future years. The uncertainty in projections is due to wide historical variations in the share of physical therapy doctoral program graduates remaining in Arizona. In 2020, Arizona’s public universities awarded 39 percent of completions, and that share is projected to increase to about 57 percent due to NAU’s planned expansion and UA’s new program, as well as new and expanded programs at private institutions.
Physicians: There is a notable gap in Arizona’s projected production of physicians. HRSA data shows Arizona needs more than 3,600 new physicians to reach national physician to population ratios (37 percent of the existing physician workforce). Lower five- and 10-year job growth projections combined with anticipated doubling of future degree production leads to an approximate annual worker to jobs available balance in the future. Important context for this expansion is that if Arizona does not add sufficient residency slots, the in-state retention of these additional physician graduates may differ from current estimates. This issue is not accounted for in these estimates. In 2020, the state’s public universities awarded 37 percent of the completions. That market share is projected to drop to about 27 percent as private universities produce more graduates. Note that UArizona’s planned medical doctor program with the University of Western Australia is not included in these projections and will likely add slightly to the number of future completions.

Physician assistants: HRSA data shows the physician assistant population to be slightly below the national average worker to population ratio (requiring an additional 578 workers to approach the average, or about 7 percent of the existing population). Projections are also currently close to balanced but show substantially greater production than new job growth in future years. While the role of physician assistant is generally expanding to augment physicians, requiring greater production, both the public and private universities are increasing program size or adding programs for this master’s degree-level occupation beyond projected needs. In 2020, Arizona’s public universities awarded 24 percent of the completions. That market share is projected to grow to nearly half with a planned four-fold increase (including NAU and a new program at UArizona).

Podiatrists: Annual production and new jobs in this profession are relatively small compared to other health professions. None of the ABOR institutions have podiatry programs and a private institution awards all the doctoral degrees. With flat completions, projections switch from a current gap to having annual production greater than the future slower growth in new jobs.
Clinical, counseling and school psychologists: A PsyD or PhD is the typical qualification for this profession and can take four to six years beyond a bachelor’s degree to complete. There are shortages of practicing psychologists nationwide, but the HRSA data shows Arizona is also below the national average in terms of practitioners to population with almost 850 new psychologists needed to reach the national average, which equals about 12 percent of Arizona’s existing workforce.

The projected production of psychologists in Arizona falls well short of the projected job change currently and in five years. In 2020, Arizona’s public universities awarded three-fourths of the completions. The universities’ market share is projected to increase to about 86 percent due primarily to a large PsyD program expansion at NAU.

Social workers (substance abuse, mental health and health care): This type of counseling profession requires a master’s degree. HRSA data shows the state requires an additional 2,419 social workers to approach the national average worker to population ratio, with the increase equaling 56 percent of the existing workforce. The combined projected production in Arizona in social work occupations is flat. Despite the existing significant underlying shortage, ongoing annual production is currently close to balancing with new jobs. Projected decreases in future job growth indicate greater production than need in Arizona. ABOR institutions account for all the completions. Licensure and degree requirements in Arizona are not uniform, which complicates projections. For example, many social workers practice in health, child welfare and schools that do not require a clinical license but require two years of supervised practice. Also, some social workers currently hold a BSW rather than an MSW, but the profession is moving to a master’s requirement, which may reduce production of qualified individuals.

Speech-language pathologists: HRSA data demonstrates Arizona’s speech-language pathologist to population ratio is below the national average, requiring almost 400 new individuals to reach the average. Projections for this profession show a current gap and approximate worker to new jobs balance in future years. This occupation requires a master’s degree. In 2020, Arizona’s public universities awarded two-thirds of the completions. Despite some increase in production, Arizona’s public universities’ market share is expected to drop to around 55 percent due to a new private university program.
Table 3. Health-Care Occupation Gap Analysis Projection Data

<table>
<thead>
<tr>
<th>Occupation</th>
<th>2022</th>
<th></th>
<th>2027</th>
<th></th>
<th>2032</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>New</td>
<td>AZ</td>
<td>Comp</td>
<td>Range (+)</td>
<td>Range (-)</td>
<td>Filled</td>
</tr>
<tr>
<td>Registered Nurses</td>
<td>1,822</td>
<td>2,277</td>
<td>308</td>
<td>418</td>
<td>1,822</td>
<td>455</td>
</tr>
<tr>
<td>Nurse Practitioners (incl. Nurse Anesthetists)</td>
<td>427</td>
<td>351</td>
<td>42</td>
<td>45</td>
<td>351</td>
<td>-76</td>
</tr>
<tr>
<td>Physicians (All Specialties)</td>
<td>544</td>
<td>191</td>
<td>35</td>
<td>30</td>
<td>191</td>
<td>-353</td>
</tr>
<tr>
<td>Physician Assistants</td>
<td>161</td>
<td>153</td>
<td>29</td>
<td>32</td>
<td>153</td>
<td>-8</td>
</tr>
<tr>
<td>Clinical, Counseling, &amp; School Psychologists</td>
<td>104</td>
<td>22</td>
<td>6</td>
<td>6</td>
<td>22</td>
<td>-82</td>
</tr>
<tr>
<td>Counselors (Substance, Behav, Mental, Rehab)</td>
<td>429</td>
<td>292</td>
<td>61</td>
<td>73</td>
<td>292</td>
<td>-137</td>
</tr>
<tr>
<td>Marriage &amp; Family Therapists</td>
<td>69</td>
<td>12</td>
<td>4</td>
<td>4</td>
<td>12</td>
<td>-57</td>
</tr>
<tr>
<td>Social Workers (Substance, Mental, Health Care)</td>
<td>293</td>
<td>347</td>
<td>107</td>
<td>115</td>
<td>293</td>
<td>54</td>
</tr>
<tr>
<td>Occupational Therapists</td>
<td>98</td>
<td>85</td>
<td>22</td>
<td>49</td>
<td>85</td>
<td>-13</td>
</tr>
<tr>
<td>Physical Therapists</td>
<td>200</td>
<td>124</td>
<td>39</td>
<td>86</td>
<td>124</td>
<td>-76</td>
</tr>
<tr>
<td>Speech-Language Pathologists</td>
<td>135</td>
<td>95</td>
<td>23</td>
<td>25</td>
<td>95</td>
<td>-40</td>
</tr>
<tr>
<td>Audiologists</td>
<td>7</td>
<td>18</td>
<td>5</td>
<td>4</td>
<td>7</td>
<td>11</td>
</tr>
<tr>
<td>Pharmacists</td>
<td>201</td>
<td>142</td>
<td>26</td>
<td>23</td>
<td>142</td>
<td>-59</td>
</tr>
<tr>
<td>Optometrists</td>
<td>61</td>
<td>27</td>
<td>7</td>
<td>5</td>
<td>27</td>
<td>-34</td>
</tr>
<tr>
<td>Chiropractors</td>
<td>14</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>-14</td>
</tr>
<tr>
<td>Podiatrists</td>
<td>17</td>
<td>10</td>
<td>2</td>
<td>2</td>
<td>10</td>
<td>-7</td>
</tr>
<tr>
<td>Dentists (All Specialties)</td>
<td>122</td>
<td>107</td>
<td>28</td>
<td>21</td>
<td>107</td>
<td>-15</td>
</tr>
<tr>
<td>Dental Hygienists</td>
<td>155</td>
<td>98</td>
<td>30</td>
<td>36</td>
<td>98</td>
<td>-57</td>
</tr>
<tr>
<td>Dietitians &amp; Nutritionists</td>
<td>56</td>
<td>24</td>
<td>11</td>
<td>14</td>
<td>24</td>
<td>-32</td>
</tr>
<tr>
<td>Genetic Counselors</td>
<td>3</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>3</td>
<td>0</td>
</tr>
</tbody>
</table>

15 Negative gaps (i.e., more new jobs than new completions staying in Arizona) are in bold. To reflect Arizona's public universities’ market share of the Arizona workforce, completions (AZ Comp) have been adjusted by profession. See NIS Nursing Solutions Inc. Report pg. 5.
CONCLUSION

A review of Arizona’s current workforce data and forecasts of the state’s workforce needs suggests professions such as nursing may require more comprehensive and collective strategies for program investments to make a significant difference in workforce supply. This is because of factors including a significant imbalance in the current nursing supply impacted by ongoing turnover. Arizona’s public universities make up a small share of completions, which may require more comprehensive and collective strategies for program investments to make a significant difference in nursing. Strategies could include program expansions and collaborations with employers to ensure graduates are well-prepared for the workforce and more likely to stay in the profession, thereby balancing the need for new production with increased retention measures. Similarly, the potential for growth among physicians is influenced by external factors such as residency availability - impacting the number of practicing doctors in Arizona.

Data also provides context for professions such as pharmacy where investments successfully balanced supply. University program interviews support this observation. The pharmacist example highlights the need to keep a watchful eye on supply and to manage investments in areas where there is potential for oversupply. However, a potential for oversupply can simply mean an increased likelihood of graduates becoming employed outside of Arizona and is not a reason to preclude potential expansions if these make sense for the university.

The underlying uncertainty of forecasting is also a reason to continue to monitor Arizona’s health-care workforce. Other program expansions, changes in the health-care delivery system (e.g., the use of technology for care delivery) or changes in Arizona’s overall economic conditions are examples of external factors that will impact Arizona’s health workforce needs and may change whether the results of this analysis hold true in the future.

In addition, while this analysis does not examine the distribution of workers across the state, external data clearly demonstrates that rural areas of Arizona experience lower health-care worker to population ratios, and universities should pursue opportunities to improve access to care for rural Arizonans.

Finally, mental health professions, including psychologists, counselors, marriage and family therapists, and social workers, are particularly complex. As noted in the August report, some employers reported they were not actively recruiting for workers because they do not believe there is a sufficient supply of qualified professionals to fill those jobs. As such, a conventional supply and demand analysis may not provide the full picture of an optimal mental health workforce.