

The Arizona Health Care Workforce: Nurses, Pharmacists, & Physician Assistants

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Project Team:

Professor & Director, CHIR	William G. Johnson, PhD william.g.johnson@asu.edu
Assistant Professor, CONHI	Barbara Wilson, RN, PhD barbara.l.wilson@asu.edu
Senior Informatics Analyst	Miwa Edge miwa.edge@asu.edu
Senior Informatics Analyst	Yue Qiu, MPH yue.qiu@asu.edu
Research Analyst	Erin L. Oliver erin.oliver@asu.edu
Project Director	Kathleen Russell kathleen.m.russell@asu.edu

William G. Johnson, PhD provided oversight of all analysis for the following report. The **Nursing Workforce** section was authored by **William G. Johnson, PhD** and **Barbara Wilson, RN, PhD**. **Yue Qiu, MPH** was primary author of the **Pharmacy Workforce Section**. **Erin Oliver** was primary author of the **Physician Assistant** section.

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Executive Summary

The demand of health care services in Arizona is expected to increase substantially due to the rapid population growth, especially faster elder population growth. To address the health need of Arizona residents, health care system depends on adequate health care workforce with sufficient qualifications to deliver the essential health services. In formulating health policies and program planning, health policy makers need information on the supply, demand, distribution, education, employment of the health care workforce to make informative decisions.

The Arizona Health Care Workforce report is designed to provide detailed information and analysis on the characteristics of the health care workforce including nurses, pharmacists, and physician assistants. The 2008 renewal cycle marked the first use of the revised data collection instrument for nurses and the first year in which data were collected on the pharmacy workforce and physician assistants. Some highlights of the results are:

Registered Nurses

- The ratio of RNs to population in Arizona is still below the national average
- The objective of reaching 825 Registered Nurses in Arizona by the year 2017 requires a net increase of 49,000 registered nurses.
- Given existing attrition rates, the achievement of the 825 ratio will require the entry of 75,000 new RNs into the Arizona workforce by 2017.
- Achievement of the 825 ratio does not guarantee that the supply of nursing services to direct patient care will be adequate because approximately one-quarter to one-third of RNs who are employed in nursing do not provide patient care.
- Among Advanced Practice Nurses, the ratio of nurse practitioners to population is higher than the national average while all the other specialty groups among APNs are below the national averages.
- The data on APNs are not yet sufficient to predict future trends in supply
- The analysis of the LPN workforce is limited because, among other factors, the LPN license is frequently obtained as a means of acquiring advanced standing in training to be RNs.

Pharmacists and Pharmacy Technicians

- The ratio of pharmacists to population in Arizona is close to the national average. It is predicted that this ratio may increase faster than national average (Appendix Table C2). The increase may, not however, represent a sufficient increase to offset increase in demand for services associated with the rapid aging of Arizona's population.
- There is a continuing shift in the employment of pharmacists from independent pharmacies to retail chain pharmacies
- The pharmacy workforce is relatively young. Attrition rates due to aging can, therefore, be expected to be relatively low for many years.
- The supply of pharmacy technicians is likely to remain relatively constant or decrease slightly but the proportion of technicians with PTCB certification is likely to increase.

Physician Assistants

- The physician assistants are the only health professionals in this report whose data are limited to the information collected for licensing. It is hoped to add survey questions to the applications for licenses in the future.
- Physician Assistants are a very important component of the health care workforce since they disproportionately practice in rural areas, partially compensating for the pronounced shortage of physicians in these areas.

This report provides a descriptive overview of the characteristics of health care workforce including nurses, pharmacy workforce, and physician assistants. Projections of future supply and demand are made with some level of uncertainty with limited information available for some health professionals. Nevertheless, the information presented here will help decision-makers to better understand and address health care workforce issues to improve health care system with efficient and properly trained health care workers.

Part I. Introduction

Background

The Arizona Hospital and Healthcare Association (AzHHA)/Center for Health Information & Research (CHIR) Health Care Workforce project began in 2006 – 2007 with a study of registered nurses (RNs) based on information from the records of the Arizona Board of Nursing (ABON). The ABON information included data on all nurses with active Arizona licenses regardless of renewal date or location. Additional information was obtained from registered nurses who renewed their licenses during 2007. The report, presented to the AzHHA task force in December 2007, predicted a significant and persistent shortage of registered nurses in Arizona and one unlikely to be resolved by the year 2017.

Constraints on the 2007 data limited information on the citizenship of RNs, the percentage of RNs working in providers' offices, the percentage of RNs in direct patient care, and the extent to which employed RNs worked in part-time or full-time positions. The ability to distinguish between RNs working in Arizona or in other locations was also limited. The limitations required the use of a number of assumptions. The limitations were resolved through a coordinated effort between AzHHA, Arizona State University's (ASU) CHIR, and ABON in revising data collection protocols for the 2008 renewal cycle.

The 2008 renewal cycle marked the introduction of results for Advanced Practice Nurses (APNs, which include Nurse Practitioners or NPs, Clinical Nurse Specialists or CNSs, Certified Registered Nurse Anesthetists, or CRNAs, and Certified Nurse Midwives or CNMs) and Licensed Practical Nurses (LPNs). A more limited set of results is presented for Physician Assistants (PAs). The results for PAs are based solely on licensing information from the Arizona Medical Board (AMB) which is more limited than the information collected for the other components of our health care workforce studies.

This report first reviews the background of the nursing shortage in the United States (U.S.), followed by some concepts and definitions and a description of a forecasting model. A review of the characteristics that influence persons to pursue careers as health care professionals will follow, including what is known about the importance of these influential characteristics, as well as other factors that influence workforce recruitment and retention. The results are presented in sections, namely the results for RNs, the subset of RNs who are advanced practice nurses,

LPNs, then pharmacists and pharmacy technicians and, finally for PAs. Each section includes a description of the results for the 2008 renewals. Except for PAs, where survey questions were not asked, the 2008 survey is used as a representative sample and the results are weighted by the numbers of active licensees to produce population estimates.

Methods

CHIR has a long history of collecting and managing data on the Arizona physician workforce dating back to the early 1990s. The data collection process involves adding survey questions that differ among different licensing cycles to license applications. First time applicants are asked to respond to different survey questions than physicians who are renewing existing licenses. The information from the survey questions is combined with the information collected for licensing to create individual physician records. The data include demographic information on every physician licensed in Arizona along with specialty, board certification, office location, practice changes, retirement status, hours worked, medical school, date of graduation from medical school, and graduate training experiences.(Johnson, Rimsza, Garcy, & Grossman, 2005; Rimsza, Johnson, Speicher, & Grossman, 2006). This same model is now being applied to other health care professions, including RNs, APNs, LPNs, pharmacists and pharmacy technicians. The reference period chosen by AzHHA for the workforce estimation is from 2004 through 2017.

The analysis of the RN workforce from December 2007 to July 2008 included significant changes to the online licensing renewal applications at the Arizona Board of Nursing (ABON). The data collected from the 2008 renewals include more extensive information on the following characteristics:

- weeks, hours per week and months per year worked by employed nurses
- citizenship
- direct patient care
- participation in registries
- reasons for leaving nursing

Ratio Measures of the Adequacy of Supply

The number of health care professionals for each 100,000 persons in a population is a commonly used proxy for the adequacy of a health care workforce. AZHHA has, for example, adopted the national average ratio of RNs per 100,000 population as its target for the workforce in Arizona in 2017. Despite their widespread use and convenience for interstate comparisons, ratio measures of this type are subject to several important limitations. The ratios are not, for example, adjusted for interstate differences in population characteristics that can be expected to affect the demand for health care or the mix of services needed by a particular population. This limitation is especially important for comparing Arizona to national averages because the population of Arizona is so markedly different from the population in most other states. Arizona has a much higher proportion of Hispanic or Latino citizens than most states, a much lower proportion of its population is Black or African American, and the state is home to the largest American Indian/Alaska Native populations in the United States. A very large segment (approximately one-sixth) of the population of Arizona qualifies for the state Medicaid program. The ratio measures do not reflect any of these and other differences in the needs of a population for health care and, thereby, limit the value of interstate comparisons.

Another limitation of the ratio measures is that they do not convert the total number of health care professionals into the hours of service supplied nor the extent to which the services are for patient care or for activities such as clinical research. We can make these adjustments for Arizona but no comparable national data are available.

Full Time Equivalent Measures

A full time equivalent, or FTE, is a common measurement used to determine or describe the workforce. In most institutions, an FTE is calculated as the number of total hours worked divided by the number of compensable hours in a work year considered to be full time work for an occupation. An FTE for employees who typically work 40 hours per week year-round, with a paid two week vacation, would, for example, be defined as 2,080 hours. The measures of FTE will vary somewhat among the professions, with nurses exhibiting the most variations in weeks worked and hours worked. The definitions of FTEs for the different health care professionals are described in their respective sections in this report. The data needed to measure FTEs for physician assistants are not available.

Forecasting Models

Our forecast for 2008 – 2017 considers the net changes required to offset population growth, replace health care professionals lost to other occupations and retirement, and increase the supply to reach the ratios of professionals to population that are used as approximate guides to the adequacy of supply.

The forecasting model does not address the reasons that persons decide to enter a school, to remain or leave a health care profession once employed, or to move into Arizona or leave the state. These reasons are the topic of the next section in this report.

Net change (+-) year 1 to year 2 (+-) =

Health care professionals employed year 1

Plus:

- HCPs who become employed in year 2
- New graduates who remain in Arizona and who take HCP jobs
- HCPs who come from out of state and accept jobs in Arizona: These persons include graduates from other countries and other states who may be new graduates or persons with a history of HCP employment
- HCPs who have not been employed in health care who take health care jobs

Minus:

- HCPs who leave health care employment in year 2
- HCPs who retire, are unemployed involuntarily, permanently or temporarily disabled, or who leave employment to pursue additional education. This group also includes persons who leave the labor force to engage in household production, which includes activities such as homemaking or caring for an ill family member.

Determinants of Supply

The characteristics that influence an individual's choices among alternative careers, alternative occupations, and alternative individual jobs are known to include the differences among the alternatives in the following characteristics:

- The ratio of the wages offered by the alternative opportunities.

- The ratio of non-wage compensation (i.e. “fringe benefits”) offered by the alternative opportunities.
- The relative working conditions, including *risks* associated with the work, the *physical workplace environment*, and *organizational characteristics* such as degree of individual control over practice, prestige, and status of work as perceived by society.
- The amount of non-wage income available to a person if they are not employed (e.g., trust fund income; income of another person in the household, etc.).
- The value of ‘household production’; that is, what is given up for each hour that a person spends providing services within a household (e.g., value of caring for a household member who is sick; care for children) for each hour spent in the labor force.
- The ratio of expected earnings to the costs of training required for an occupation.

Our analysis of the health care workforce must omit many of the determinants of supply because the data are not available. Although the omissions do not affect our counts of health care professionals or our projections, they do limit our understanding of all of the factors that could be the targets of interventions designed to alter the future size and composition of the health care workforce in Arizona.

Part II. Nursing Workforce

Section IIA: Registered Nurses

The national nursing shortage was initially estimated to reach over 800,000 by 2020 (Auerbach, Buerhaus, & Staiger, 2007). These estimates assumed that future cohorts of nurses would follow the same career paths as the existing workforce, entering nursing school shortly after high school graduation. It was also assumed that the proportion of high school graduates entering nursing would decline over time, as had been the case. The projected declines were attributed to competing employment opportunities (notably for women) (Buerhaus et al., 2006; Hassmiller & Cozine, 2006), lack of encouragement from high school counselors (Brewer et al., 2006), and reductions in sex discrimination in the labor force as a whole (Suganthi, 2007).

The demographics of nursing school applicants began to change in the late 1990s with an influx of people who selected nursing as a second career (Mennick, 2007). It is also speculated that the tragedy of 9/11 induced many to seek careers in helping professions (Auerbach et al, 2007). Whatever the reasons, nursing school enrollments have substantially increased since 2000. Although the increase in enrollments will increase supply, the nursing shortage is estimated to equal 340,000 RNS by 2020 (Auerbach et al., 2007).

The nursing shortage will be intensified by the increasing needs for nursing care among aging members of the baby boom generation (Thompson, Young, Heller, & Farrow, 2001), and a wave of retirement among nurses. The average age for an RN employed in a hospital in the U.S. is 48 years, up from an average of 39 years in 2004 (Buerhaus, Donelan, Ulrich, DesRoches, & Dittus, 2007). A 2006 survey conducted by the American Association of Colleges of Nursing found that 55% of nurses surveyed intend to retire between 2011 and 2020 (AACN, 2007). The effect of retirements will be intensified by a shrinking pool of potential replacements in the U.S. The 44 million Generation Xers (born between 1965 and 1980) are the smallest entry-level workforce since the 1930s (Cooper, 2003). It is estimated that the number of entrants into the nursing workforce will be insufficient to replace departures by 2015 (Thrall, 2007).

The important influences on nurses' decisions to work or select nursing as a profession include *career* (individuals find nursing as a fulfilling and rewarding career despite alternative opportunities, and are motivated and dedicated to improve nursing practice), *family priorities*

(family needs take precedence over professional needs); *work choices* (nurses switch jobs to move to a less stressful one or 'slower pace'), and the *flexibility* of nursing work schedules, allowing individuals to meet family and personal demands which are often more important than monetary benefits or rewards (Dickerson, Brewer, Kovner, & Way, 2007).

The 2008 Renewals as a Sample of all Active RNs in Arizona

The data revisions carried out by ABON with the cooperation of ASU's Center for Health Information & Research in 2007 provided information in 2008 on a number of important topics, including hours worked and distinctions between direct patient care and other activities. The data in this section include both renewals of existing licenses and licenses being issued for the first time in 2008. We attempt to maximize the value of the 2008 information on renewals with Arizona addresses by treating the renewals as a representative sample of all RNs with Arizona addresses. We exclude the first time licensees from these comparisons because they are not representative of the population of RNs in the active license pool. They will, for example, be younger and their occupational distribution is more likely to reflect entry level jobs than the distribution of employments among the larger and older group of RNs with existing licenses.

The test of the validity of this approach is the extent to which the 2008 renewals share the characteristics of the population of all RNs with active Arizona addresses. The 2008 renewals numbered 10,417, representing 19.2% of all RNs with an Arizona license and an Arizona address. As indicated in Figures 1 through 2, the 2008 renewals closely resemble the population of RNs with existing licenses who live in Arizona.

For both 2008 RN renewals (10,417) and all active RNs (54,260), the majority of Arizona nurses work in Maricopa County (RN 2008 renewals, 57.5%; all active RNs, 49.1%)—a finding not surprising given Maricopa County includes the Phoenix metropolitan area with over 3.2 million residents (Maricopa.gov, 2009). The second most frequent county of RN employment is Pima County, representing 18.3% of the 2008 RN renewals and 15% of all active RNs. The difference in percentages between 2008 renewals and all active RNs may reflect recent changes made in the data collection protocols: in the 'all active RNs' subset (utilizing previous data collection methods), nearly 19% (18.8%) of licensed RNs have the county of employment as 'unknown'; in the current 2008 renewals, this number is less than 5% (4.3%). All remaining counties for both the 2008 renewal and active RNs accounted for 4% or less of the employed RNs, reflecting the

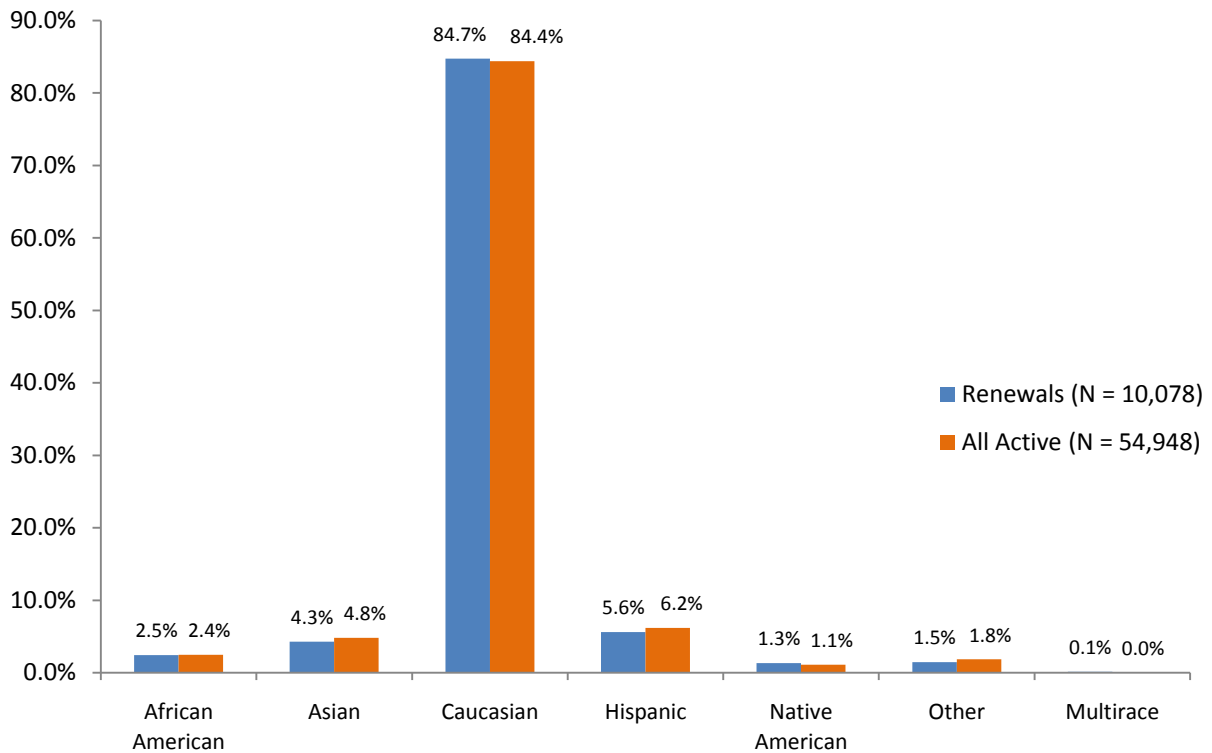
high concentration of the nursing workforce centered in the Phoenix and Tucson metropolitan areas (Table 1).

Table 1. Distribution of Arizona RN Workforce by County: 2008 Renewals and All Active RNs

<i>County</i>	<i>2008 Renewals (%)</i>	<i>All Active RNs (%)</i>
Apache	0.66	0.44
Cochise	1.65	1.33
Coconino	2.65	2.24
Gila	0.66	0.59
Graham	0.39	0.40
Greenlee	0.05	0.04
La Paz	0.07	0.10
Maricopa	57.45	49.14
Mohave	2.26	2.06
Navajo	1.24	1.02
Pima	18.34	14.96
Pinal	4.13	3.24
Santa Cruz	0.32	0.21
Yavapai	3.99	3.17
Yuma	1.86	1.58
Unknown	4.29	18.82

Source: ABON administrative data, 2008

Figure 1. 2008 Renewals vs. All Active RNs with AZ Address, by Race/Ethnicity

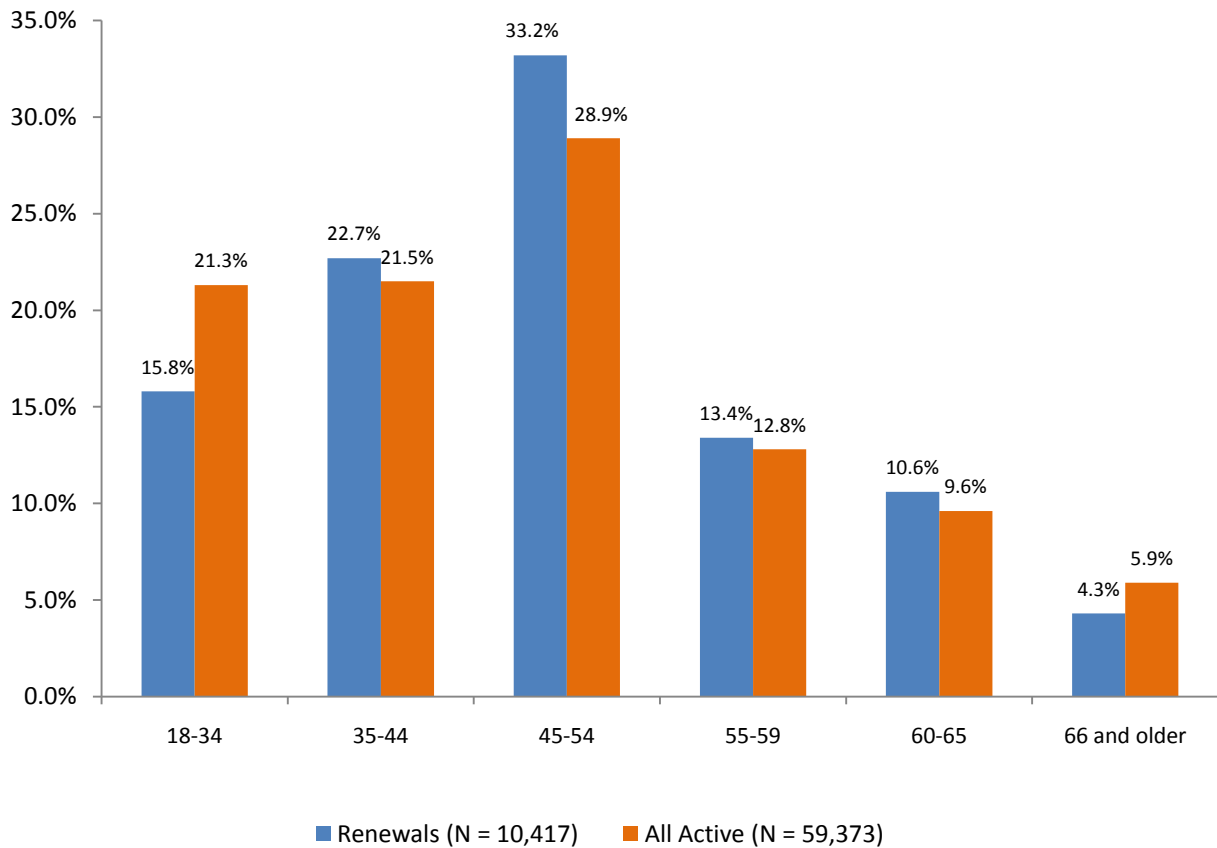


Source: ABON data, 2008.

Note: 363 renewal records were missing response to this question; 4,425 active RNs with AZ addresses were missing response to this question.

Caucasian nurses in both groups were the predominant race/ethnicity, with 84.7% (2008 and 84.4% (all nurses) respectively. The second highest reported category was Hispanic (5.6% in 2008 renewal group and 6.2% in 'all RNs'), followed by Asian with 4.3% of the 2008 group and 4.8% of the 'all RNs' reporting that as their primary ethnicity. African American nurses accounted for 2.5% of the renewals and 2.4% of the active RNs. Native Americans and 'other' accounted for the remaining ethnicity, with less than 2% each in both the 2008 cohort and the "all RNs" group (Figure 1).

Figure 2. 2008 Renewals vs. All Active RNs with AZ Address, by Age Group



Source: ABON, 2008.

Figure 2 shows the 2008 renewals are slightly younger, on average, than the population of Arizona RNs as a whole with the exception of the oldest and youngest age groups. More than 28% of the RNs with active Arizona licenses are 55 or older. An additional one-third (33%) of the RNs with active licenses is between 45 and 55 years of age. In total, 61% of Arizona’s RNs with active licenses are ‘baby boomers’ and are part of the largest cohort of RNs entering the window of retirement. There may be significant numbers of nurses in the older age groups who will retire, a fact that will not be recorded by ABON until their licenses come due.

One limitation of using 2008 renewals as a sample is the extent to which nurses who have not renewed in 2007 – 2008 will fail to meet the employment criteria when their licenses come due for renewal. Slightly more than 3% of RNs who were eligible for renewal in 2007 or 2008 allowed their licenses to lapse. Given that caveat, the comparisons support using the 2008

renewals as a sample of the larger population for the estimation of characteristics that are only measured in the 2008 results. The characteristics include:

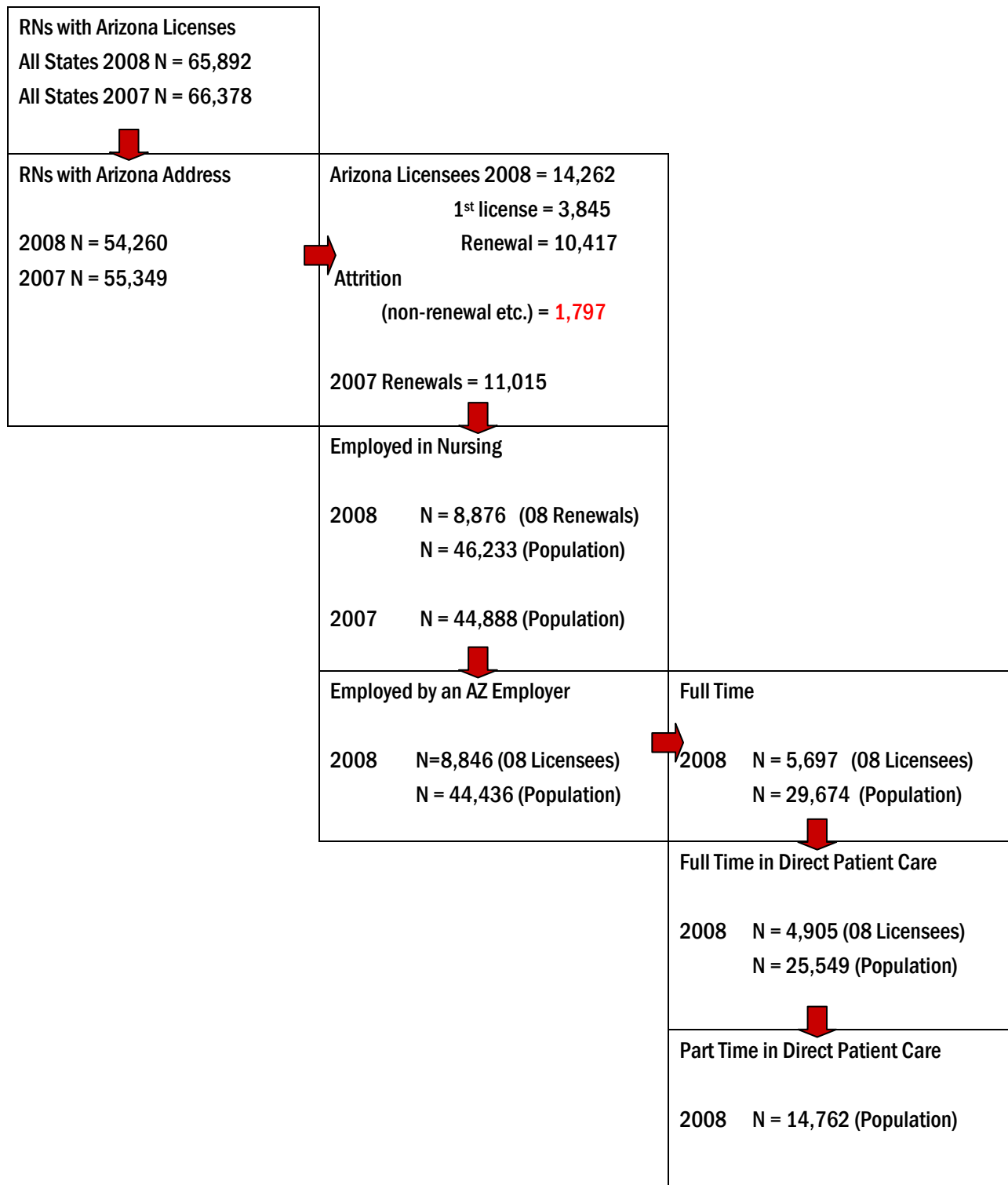
- the percentage of RNs employed in nursing;
- the percentage that provide direct patient care;
- the percentage who work in pools or registries
- the percentage who are respectively U.S. citizens or documented immigrants.

The results are based on RNs who responded to the questions on these topics. Response rates were generally quite high varying from 100% to 94%.

Approximately 85.2% of the 2008 renewals were employed in nursing. Applied to the 2008 population of RNs with Arizona addresses (N = 54,260), the 2008 proportion yields an estimate of 46,230 RNs employed in an occupation that requires an RN license. The estimate for 2007, which used the 81.1% employment rate from the 2004 Health Resources and Services Administration (HRSA) survey, was 44,888. Expressed as the ratio of RNs employed in nursing to Arizona residents (6.34 million in 2007 and 6.629 million in 2008), the estimates are 697 RNs per 100,000 for 2008 and 708 RNs per 100,000 for 2007. Assuming that the percentage of active Arizona RNs who are employed in 2008 equals the percentage for the 2008 renewals, the number of employed RNs increased slightly between 2007 and 2008.

The estimates for RNs in Arizona are summarized in Figure 3. The 2007 data are, because of data collection problems, much less certain than the data for 2008 and should be interpreted with caution. The 2008 results on RNs employed health care in Arizona are likely to be somewhat below the actual numbers because they are based on the RNs who responded to the questions on employment. Response rates are more than 94% so response bias is unlikely to be significant. Unless the non-respondents were systematically different from the respondents in regard to their employment, the differences are likely to be small. That is, for example, if the percentages of RNs employed in health care are similar for respondents and non-respondents, there should be relatively little difference between the estimates and actuality because the percentages are applied to the actual population of RNs to produce our population estimates.

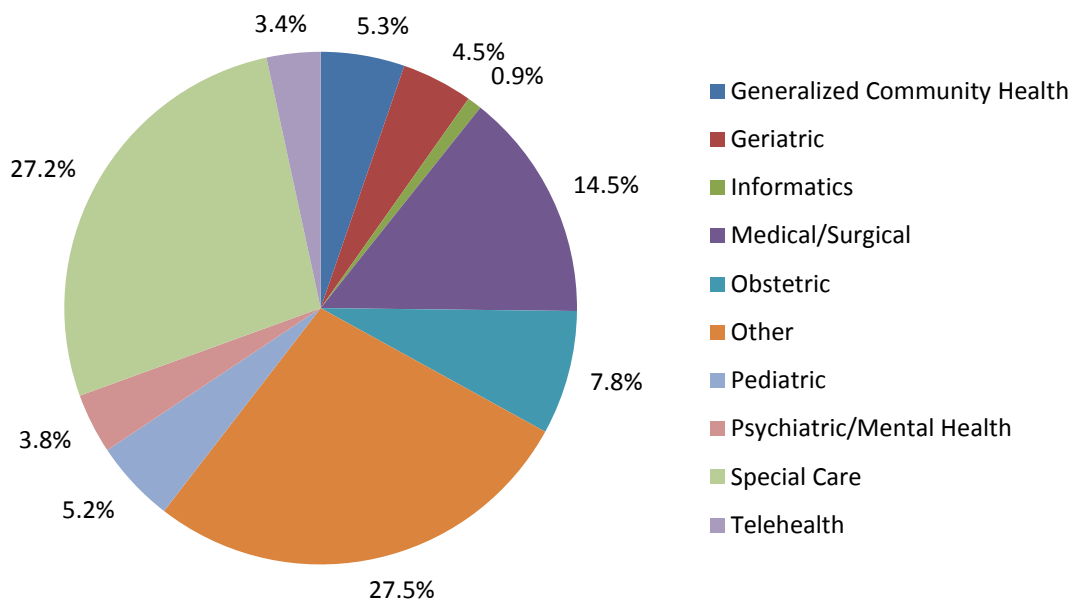
Figure 3. Registered Nurse Estimates



RNs Employed in Nursing by an Arizona Employer

The data on the 2008 renewals include the locations of the places of employment for the RNs. Approximately 3.9% of those who responded to that question worked outside Arizona while maintaining an Arizona address. The adjustment for out-of-state employment reduces the number of RNs employed in nursing in Arizona by 345 to 8,531. Subsequent sections of this report rely on the 8,531 RNs employed in nursing in Arizona by Arizona employers as the 2008 sample.

Figure 4. Clinical Area, RNs Employed in Health Care in Arizona 2008 (N = 8,455)



Source: ABON data, 2008.

Note: 443 records were missing response to this question

Table 2: Percentage of Arizona RNs by Clinical Area Reporting Direct Patient Care Responsibilities, (N = 7,227)

<i>Clinical Area</i>	<i>Percentage Reporting Direct Patient Care</i>
Generalized Community Health	4.6%
Geriatric	4.0%
Informatics	0.2%
Medical/Surgical	14.8%
Obstetric	8.6%
Other	23.8%
Pediatric	5.8%
Psychiatric/Mental Health	3.4%
Special Care	31.3%
Telehealth	3.0%

Source: ABON data, 2008.

Nearly 85% of all respondents reported providing direct patient care. More respondents in the clinical area of “special care” reported direct care responsibilities than any other clinical area (Table 2).

For the 2008 RN renewals, the largest identified clinical area of employment (excluding ‘other’ at 27.5%) was ‘special care’ at 27.2%. With the ‘all active RNs’, this category accounted for 22.3% and was also the largest identified clinical area of employment (excluding ‘other’ at 30.6%). Medical-surgical nursing accounted for 14.5% of the 2008 RN renewals as clinical area of employment, compared to 15.7% of all active RNs. Variation between 2008 renewals and all active RNs occurred in ‘generalized community health’; in the ‘all active RNs’, generalized community health accounted for slightly over 10% of the place of clinical employment, nearly double that identified in the 2008 RN renewals (5.3%). Obstetrical nursing was comparable in both groups, representing 7.5% of all active RNs and 7.8% of the 2008 RN renewals. Other clinical areas of employment were comparable between the 2008 renewals and the ‘all active RNs’ with the exception of pediatric nursing, which accounted for only 1.4% of the ‘all active RNs’ and over 5% (5.2%) of the ‘2008 RN renewals’. It should be noted that the ‘all active RNs’ data contained a significant number of missing responses to clinical area (N = 24,808, or 37.6%

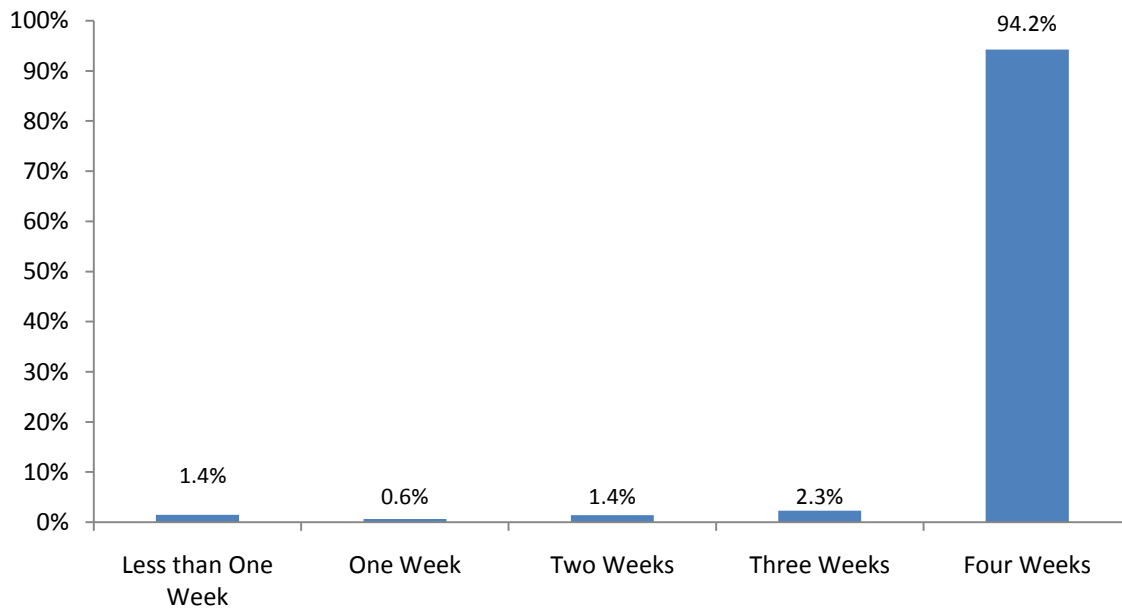
of total respondents) and therefore must be interpreted with caution. The 2008 RN renewals had only 76 missing responses, representing less than one percent (0.89%).

The next step in the process is to convert the numbers of RNs to a supply of nursing services.

Converting Numbers of RNs to Supply of Nursing Services

The supply of nursing services is the product of hours worked per week; weeks worked per month; and months worked per year (Figures 5 - 7). The nursing occupation is, relative to most occupations, quite unusual in its variety of schedules and work hours.

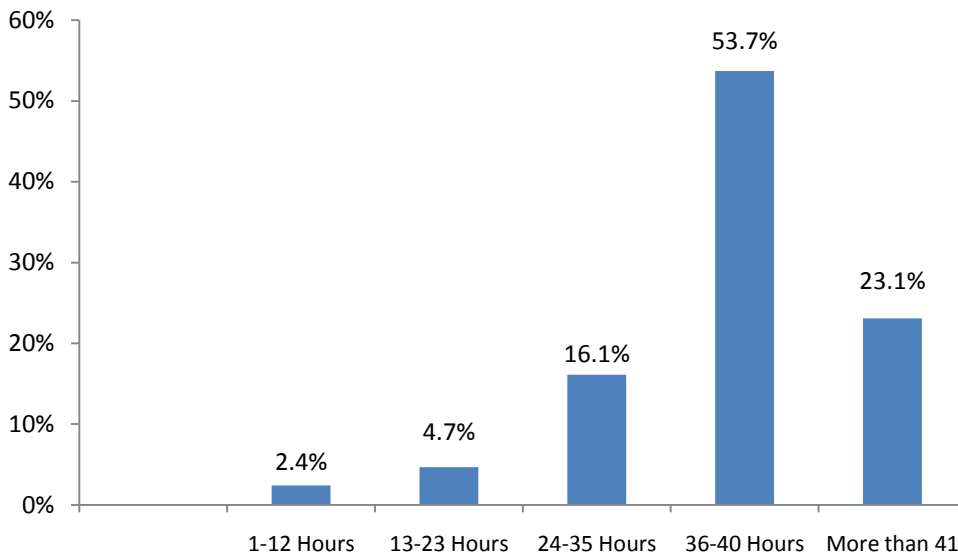
Figure 5. Number of Weeks Worked per Month, 2007 (N = 7,991)



Source: ABON data, 2008.

Note: 540 records were missing response to this question.

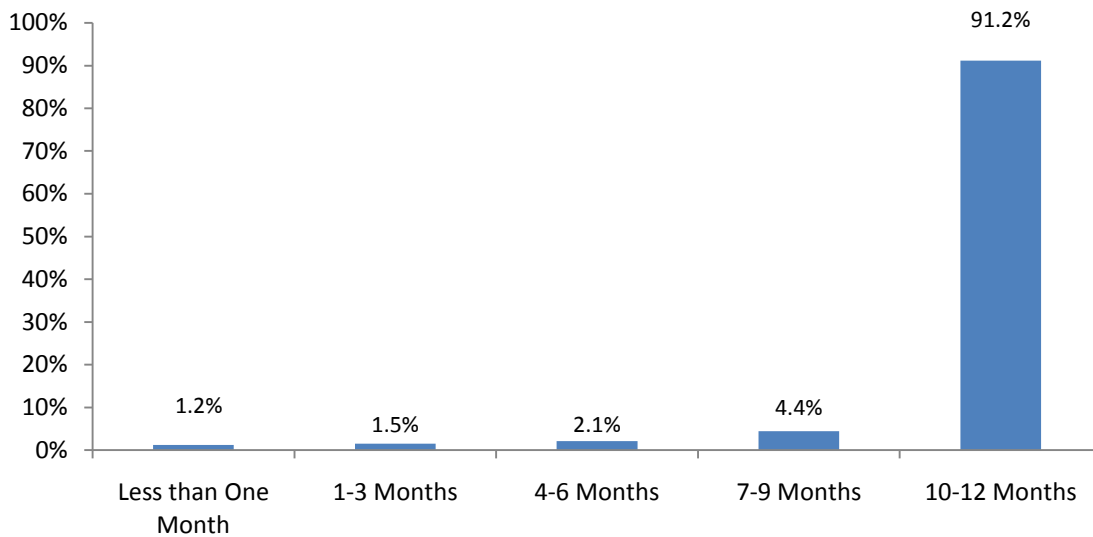
Figure 6. Number of Hours Worked per Week, 2007 (N = 8,286)



Source: ABON data, 2008.

Note: 245 records were missing response to this question.

Figure 7. Number of Months Worked per Year, 2007 (N = 7,997)



Source: ABON data, 2008.

Note: 534 records were missing response to this question.

FULL TIME EQUIVALENTS

Many health care organizations or institutions identify a full time employee as one who works at or greater than 36 hours/week, year-round (given 12 hour shifts are common). We assume that an average vacation is two weeks. A person who works in every week in the year at 36 hours per week would work a total of 1,800 hours per year. A recently-introduced practice requirement for RNs and LPNs in Arizona may also influence the number of hours worked in a given year. ABON now stipulates that the applicant must have practiced at least 960 hours in the past five years in a position that recommends or requires an RN or LPN license. This includes any position requiring an active nursing license (ABON, 2007). It also could include graduating from a nursing program within 5 years prior to applying for renewal.

Our survey questions are asked in terms of intervals (e.g., 1-12 hours, 13-23 hours, etc.) rather than an exact report requiring recall for a twelve month period. This approximation limits total hours worked for an RN working four weeks per month and twelve months per year to less than 1,700 hours unless he or she works more than 41 hours per week. Therefore, we adopt a total hours worked equal to 1,770 hours per year as equivalent to full time employment.

FIRST TIME LICENSEES

Approximately 3,845 or 27% of the RNs who were licensed in 2008 were new entrants. Of the new applicants, 85% were female and more than 60% were between the ages of 18 and 34. Approximately one-fifth (20.7%) of the new licensees were between the ages of 35 and 44, with an additional 19% age 45 or older. With nearly 40% of first time applicants over the age of 34, Arizona mirrors national trends which reflect an increase in the number of workers who enter nursing as a second career. Assuming that the percentage employed in nursing was the same as the other 2008 licensees, approximately 3,311 of the new licensees were employed in nursing.

The new RN applicants in 2008 also reflect a shift in the race/ethnicity of Arizona's nursing workforce. Of the new applicants who reported race/ethnicity (N = 3,008), approximately 74% were non-Hispanic White compared to 84.7% of those who renewed their licenses in 2008. While only 5.6% of the 2008 renewal workforce reported Hispanic ethnicity, that number increased two-fold, with 11.3% of the new applicants being Hispanic. The percentage of first time applicants who were African American was 3.9%, an increase from the 2.5 % African

Americans who renewed their license (and more reflective of Arizona's ethnic demographic distribution in general). Asians represented 6.5% of first time RN applicants, up from 4.3% in the 2008 renewal cycle.

Projections

The net change in the supply of RNs in a year is the difference between first time licensees and RNs who leave nursing or leave health care as an occupation. The additions are the numbers of RNs seeking their first license in Arizona or who return to a nursing employment from a different occupation. The negative changes include: the number of RNs who retire or become disabled and the number who move to non-nursing occupations.

The ratio of the number of RNs to 100,000 persons in a population is a commonly used criterion for the adequacy of the supply of RNs. AzHHA has set the national average ratio of 825 RNs per 100,000 population as one of the targets for Arizona workforce (HRSA, 2007). As we mentioned in a previous section, the national ratio may be somewhat misleading since a national average may be a poor representation of the needs of the population of Arizona which is obviously very different than that of most other states.

There are also definitional problems that limit the application of national ratio measures of supply. The National Sample Survey of Registered Nurses (NSSRN) used this approach when reporting data on the actively licensed registered nurse population as of March 2004. Samples were drawn for each state's list of nurses with active licenses, and workforce was then estimated for each state and geographic area as a percentage of the population (listed per 100,000 residents). For all states combined, the average RN per 100,000 population was 825, and subsequently was referred to often as a baseline measurement in evaluating nursing shortages. Considerable variability existed between states; for example, the District of Columbia had over 2000 RNs per 100,000, and California reported the lowest ratio at 589 per 100,000 population. Arizona's reported 682 employed nurses per 100,000 population provided the baseline for this report.

A total of 50,691 RNs across the U.S. ultimately participated in the 2004 NSSRN, and the report presented the analysis of those RNs who were licensed in nursing as of March 2004. Nurses were considered 'active' if they held a current license, regardless of whether they were currently employed in nursing or how much they were working in a position that required an RN license.

Hence the data may be an overestimation of the available nursing workforce and should be interpreted with some caution.

A simple forecasting model is used to project the number of RNs needed to maintain existing nurse to population ratios in Arizona and, in addition, to increase the ratios to the national averages. The average ratio of employed RNs per 100,000 in Arizona was 682 employed RNs per 100,000 in 2004. The ratio increased to 708 in 2007 and fell to 697 in 2008. We then adjust the projections to reflect the more detailed classification of RNs into FTEs and FTEs in direct patient care.

REPLACEMENT FOR ATTRITION

Approximately 1,164 or 12% of the RNs with licenses eligible for renewal in 2008 did not renew. An additional 633 RN licenses lapsed or were inactive even though the licensees were not to be renewed in 2008. The losses represent approximately 3.3% of all RNs with active licenses and Arizona addresses. We subsequently use the 3.3% rate to estimate attrition in our projections of the future supply of RNs in Arizona.

Some of the non-renewals may have been unable to meet the employment criterion. The recent introduction of the employment criterion affects an unknown number of RNs in the cohorts eligible for renewal in 2009 and subsequent years. Should the group be large, the use of all active license holders to make labor force projections will significantly *overstate* the potential number of RNs in the health care workforce in Arizona. Since the renewal applications are the primary source of our data, nurses who did not renew deprive us of the reasons for their decision. The rate of attrition is, therefore, the result of the combination of the factors that we discussed and the components are not strictly identifiable.

We can attempt to make some inferences concerning the potential sources of current and future attrition by considering the aging of the nursing workforce. Nursing shortages will, all else equal, develop more quickly in markets where RNs are older (Smith, 2007). The impact of the aging nursing workforce in the U.S. has been well described (Brewer, Zayas, Kahn & Sienkiewicz, 2006; Hassmiller & Cozine, 2006). It is estimated that about half of the nation's RN workforce will reach retirement age by 2015 (STTI, 2000).

The age distribution of RNs with active licenses who live in Arizona is described in Table 3. The table shows that in 2008 slightly more than 15% of the RNs with active licenses are 60 years of age or older and an additional 13% are between the ages of 55 and 59.

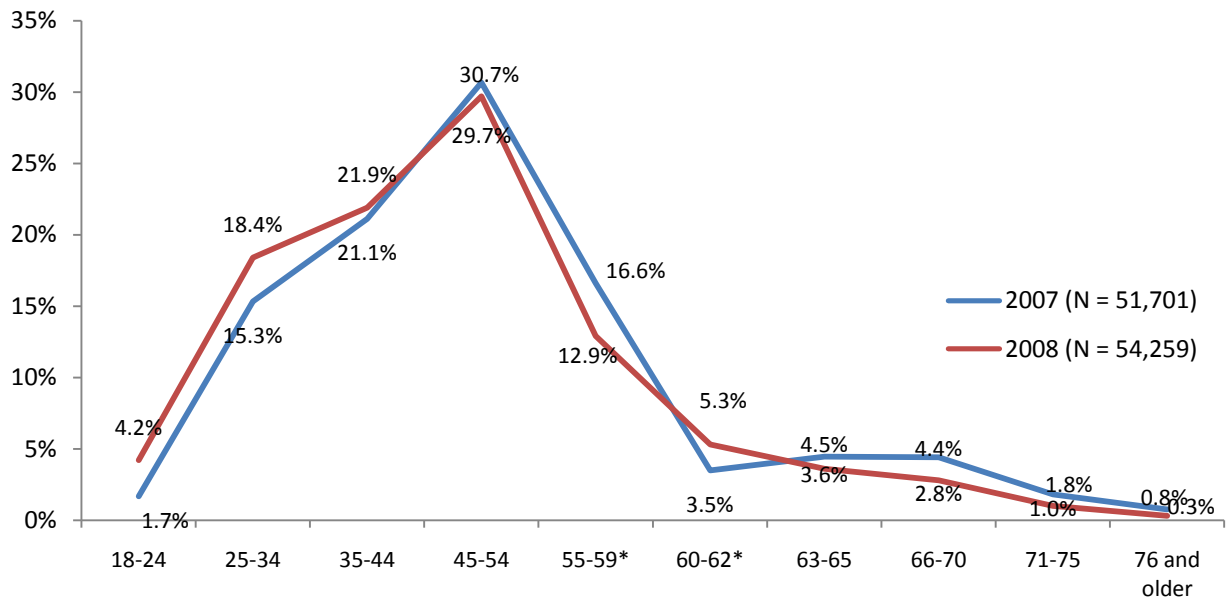
Table 3. Age Distribution of Active Arizona RNs with an Arizona Address (N = 54,260)

<i>Age Group</i>	<i>Frequency</i>	<i>Percent</i>	<i>Cumulative Frequency</i>	<i>Cumulative Percent</i>
18 - 24 years	2,252	4.15	2,252	4.15
25 - 34 years	9,955	18.35	12,207	22.50
35 - 44 years	11,896	21.92	24,103	44.42
45 - 54 years	16,090	29.65	40,193	74.08
55 - 59 years	7,013	12.93	47,206	87.00
60 - 62 years	2,866	5.28	50,072	92.28
63 - 65 years	1,958	3.61	52,030	95.89
66 - 70 years	1,520	2.80	53,550	98.69
71 - 75 years	556	1.02	54,106	99.72
>= 76 years	153	0.28	54,259	100.00

Source: ABON data, 2008.

Note: 1 record missing.

Figure 8. RNs with Active Licenses Living in Arizona, 2007 v. 2008, by Age Group



Source: ABON data, 2008.

Notes: 1 record missing 2008 response.

*These age groups are slighter different between the years.

The aging of the Arizona RN workforce with existing licenses and the fact that nearly 40% of new licensees in 2008 were over the age of 34 implies that attrition rates due to retirements from nursing are likely to increase in the future.

PREDICTED SUPPLY 2009 – 2017

The data for each year in Table 4 are computed by applying an average annual rate of attrition to the number of RNs with active licenses in the previous year and then estimating the number of new licenses required to reach an annual net change that will succeed in reaching a ratio of 825 RNs per 100,000 population in the year 2017. An accurate count of number of cases lost to attrition is only available for 2008. All other years are estimates. Actual numbers of RNs with active licenses are obtained for the years 2004 – 2008 with 2008 being the most certain of those counts. It is important to note that estimates based on the national average ratio of RNs per 100,000 population are necessarily limited to the number of RNs with active licenses rather than the more direct counts of RNs employed in health care or the number of RNs who provide direct

patient care. The need to maintain comparability with the national averages results, therefore, in a rather significant overstatement of the number of RNs that provide patient care.

The projections indicate that it will require a net increase of 49,000 nurses between 2009 and 2017 to bring the number of RNs with active licenses and Arizona addresses into equality with the national average of 825 RNs per 100,000 population in the year 2017. Assuming our estimates of attrition are correct, approximately 75,000 new licensees will be required to offset attrition and reach the goal of a net increase of 49,000 RNs.

Table 4: Net Changes in the Number of RNs Employed in Nursing to Reach 2017 Target

Year	Attrition @3.3% (000's)	Actual Net Change (000's)	Estimated Employed New Licenses (000's)	Total (000's)	@825 Ratio (000's)
2004				39.14	47.36
2005	<i>-1.29</i>	+1.35	+2.6	40.49	49.00
2006	<i>-1.34</i>	0.95	+2.3	41.44	50.15
2007	<i>-1.37</i>	+3.5	+4.9	44.9	51.30
2008	<i>-1.80</i>	+1.3	+3.1	46.2	52.45
2009	<i>1.52</i>	+2.1	+3.6	48.3	53.60
2010	<i>-2.70</i>	+2.1	+4.8	50.4	54.76
2011	<i>-2.82</i>	+2.1	+4.9	52.5	56.17
2012	<i>-2.94</i>	+2.1	+5.0	54.6	57.59
2013	<i>-3.06</i>	+2.1	+5.2	56.7	59.00
2014	<i>-3.17</i>	+2.1	+5.3	58.8	60.42
2015	<i>-3.29</i>	+5.38	+5.4	60.9	61.83
2016	<i>-3.41</i>	+5.50	+5.5	63.0	63.42
2017	<i>-3.53</i>	+5.62	+5.6	65.1	65.01
Total 2009-2017	<i>-26.4</i>	+48.9	75.3		

Note: Numbers in italics are estimated or predicted values. Actual numbers are in bold type

Summary

The ratio of RNs to population in Arizona is and has been below the national average. Although the available data before 2008 are subject to considerable uncertainty, the data for 2008 indicate that the number of new licenses is, given continuing growth, sufficient to reach the national average ratio of 825 RNs per 100,000 population in 2017. There have been considerable efforts to increase interest in the nursing profession and they appear to have had a favorable impact on enrollments in nursing schools. In fact, as we discuss in a subsequent section, the number of nursing students is limited more by a lack of qualified faculty and appropriate environments for training than by a shortage of students. Arizona nursing programs reported 2,052 qualified applicants were not admitted in 2006 ,primarily due to faculty shortages, which are expected to intensify through 2020. The recent deficit in the Arizona state budget has, for example, forced ASU's College of Nursing and Healthcare Innovation to reduce enrollments for the 2009 – 2010 academic years.

None of the estimates adequately reflect the effects of the current economic recession, its impact (likely to be negative) on the demand for nurses by health care providers or its impact (likely to be positive) on the numbers of recent high school graduates and mid-career entrants into nursing.

The projections exemplify the critical need for continuing growth in first time licensees if the target ratio of RNs to population is to be met by 2017. The potential sources of new RNs is the subject of the next section of this report. The sources include new graduates of nursing schools in Arizona and other states in the United States, nurses trained in other countries and U.S. citizens who shift to nursing from other careers. The other influences on the net supply of nursing services include increased retention rates and organizational or technological changes that increase the productivity of RNs effectively expanding supply without increasing numbers. We consider the potential future of retention rates in the next section but do not have the information needed to estimate the potential effects of organizational or technological change

THE SUPPLY CHAIN FOR RNS

Although gains have been made in the number of applicants accepted into nursing programs (largely as a result of SB 1260 in 2002, which charged colleges and universities with doubling the capacity in Arizona's RN nursing programs by 2007), major challenges in the expansion of the RN workforce remain. These challenges include a continuing shortage of qualified nursing

faculty, limited clinical placements sites, and limited classroom space. In addition, an unexpected state budget deficit and subsequent reduction of monies allocated to state academic institutions may decrease the number of qualified applicants admitted into nursing programs. Reductions in undergraduate admissions beginning in January 2009 are already planned at ASU's College of Nursing and Healthcare Innovation, the largest baccalaureate nursing program in the state.

The number of entrants from the U.S. is also constrained by a shortage of nursing faculty and the lack of adequate clinical placements (AACN, 2006; AACN, 2007; Allan & McClellan, 2007; Hassmiller & Cozine, 2006; Mennick, 2007). More than 32,000 qualified applicants to entry level baccalaureate nursing programs in the U.S. could not be accepted in 2006. Aging will also impact the supply of future nursing faculty. More than 75% of the current nursing faculty is expected to retire by 2019 (Falk, 2007).

FOREIGN TRAINED NURSES

There are also some influences that relate indirectly to the characteristics that we have listed. These influences include subsidies that reduce the costs of education to existing U.S. residents, and the provision of nursing as a path to the U.S. for non-residents. As the U.S. and other countries struggle to fill RN vacancies, the recruitment and employment of foreign-trained nurses have become a common strategy to stave off shortfalls in RN staffing. Although U.S. health care institutions have been using foreign countries to subsidize their workforce for more than 50 years, there has been profound expansion of organized international nurse recruitment efforts and an increasing number of countries who send their nurses abroad. For example, the Philippines have dominated nurse migration to recruiting countries, representing more than half of all foreign-trained nurses who took the RN licensure exam in 2001 (Brush, Sochalski, & Berger, 2004).

Global recruitment in nursing has become commonplace, where 4% of the 2.7 million U.S. nurses were internationally educated (Bieski, 2007). Many hospitals throughout the U.S. and in Arizona actively seek nurses from Korea and the Philippines. Nurses from India also make up a large proportion of international nurses currently working in Arizona and nationally. However, language barriers, differences in nursing practice, and discrimination can be daunting challenges in their acculturation and work performance in unfamiliar environments. In addition,

the educational standards in other countries are frequently questioned (whether baseline performance standards are carefully scrutinized to determine equivalence to U.S. standards).

Nurses often migrate to the U.S. in search of better living conditions, career advancement, or educational opportunities. However, those donor countries are now faced with the loss of key skilled health care personnel, poor working conditions, and little incentive from governmental officials to improve working conditions or wages (Bieski, 2007; Prystay, 2002). With the passage of an immigration bill (S 2611) in 2006 that removes the limit on the number of nurses who can immigrate into the U.S., this dilemma is not likely to be resolved soon. Many argue that the immigration will not only intensify the drain of workers from developing nations, such as the Philippines, but that the shortage of more than four million health care workers in 57 developing countries is already disrupting efforts to combat diseases such as malaria and AIDS (WHO, 2006).

Out of state RN recruitment may be another strategy to increase Arizona's nursing workforce, although such strategies have not typically been met with success. Brewer et al. (2006) note that the culture and work expectations of many new RN graduates have changed, particularly for those nurses born in the 1960s and 1970s. This cohort, referred to as 'Generation Xers' is viewed by many as "overconfident" and "concerned primarily about scheduling, salaries, and extra compensation for relocation expenses and paying off student loans" (Brewer et al., 2006, p. 59). Hospitals who are recruiting from out of state may not be willing or able to meet their demands. Another limitation to out of state recruitment may be the reluctance to relocate to a rural area. Although both rural and urban nursing opportunities in nursing exist in Arizona, potential candidates are often discouraged by the lower salaries in rural areas but may not appreciate the lower cost of living and affordable lifestyles.

Another strategy to engage potential candidates into nursing is the recruitment of second career or re-careering adults. Many schools of nursing are adopting accelerated second-degree BSN programs, where individuals who hold a baccalaureate's degree in a field other than nursing are targeted. Most programs find the typical accelerated student as a motivated, slightly older, 'sophisticated consumer of higher education' (Raines & Sipes, 2007, p. 329) with high performance expectations. The accelerated second degree programs are proving to be an effective innovation to quickly prepare adults into nursing that may be seeking other career avenues or looking for a change in professional status. Because nurses are both highly

respected and in high demand, this may appeal to the older worker or re-careering adult seeking a meaningful change in employment.

The active recruitment of high school (HS) students is another potential strategy to address the nursing workforce, although there has been a shift in the age of students entering nursing from the early 20s to high relative participation in the late 20s and early 30s. The RN workforce at present is not coming predominantly from students just leaving high school, but from second-career people in their late 20s and early 30s (Auerback, Buerhaus, & Staiger, 2007). For example, in examining the age distribution of students enrolled at Maricopa Community College Nursing Program in January of 2008, only 27% of those in Block I (the first semester of the program) were 25 years or younger. Nearly one third of the newly-admitted first semester nursing students (32%) were aged 31 to 40, with the mean age of 32 years (Maricopa Community Colleges Nursing Program, 2007).

However, many programs are being developed to increase the interest in health-related fields in both junior high and high school students throughout Arizona, frequently partnering hospitals and colleges. One such program, '*Roadways to Healthcare Careers*', is focused on developing the pipeline of future health care workers by engaging and encouraging students, beginning at the junior high age, to pursue careers in health care (CHW East Valley, 2008). One benefit of this program is that it also provides financial support to existing members of the health care workforce to pursue higher degrees, thereby hoping to address the severe shortage in qualified health care educators. Unfortunately, Arizona turns away over 2,000 qualified applicants in nursing programs each year due to faculty shortages and deficiencies in clinical space, so increasing the pipeline of qualified applicants will not address the immediate issues surrounding Arizona's nursing workforce shortage, but may help sustain the pipeline if nursing faculty issues and clinical placement restrictions can be attended to. Increasing the interest in nursing at the junior high and HS level must be accompanied by aggressive means to increase the number of qualified nursing faculty, which includes addressing issues as faculty salaries and aging nursing faculty.

A recent American Association of Colleges of Nursing report (December 2008) indicates that the interest in nursing careers remains high and schools of nursing throughout the U.S. continue to receive many more qualified applicants than they can accommodate, although this number has dropped from over 32,000 turned away in 2006 to 27,771 in 2008. The significant drop in the number of potential nursing students turned away may indicate that students are "frustrated

in their attempts to enroll in nursing programs . . . (and) are moving on and seeking careers in other fields” (AACN, 2008, ¶ 4). This may be particularly significant for HS students, because many state-based recruitment programs (such as the junior high and HS health careers recruitment program sponsored by Catholic Healthcare West) are now seeing heightened interests in the nursing profession from program participants. AACN cites the primary barriers to accepting qualified students as insufficient nursing faculty, lack of clinical placement sites, limited classroom space (all noted in previous AACN reports), and budget cuts. Given Arizona’s massive budget shortfall and the recent reductions in admissions at ASU’s College of Nursing and Healthcare Innovation, this problem does not appear to be resolving soon.

Another challenge in recruiting Arizona’s junior high and HS students to enter the nursing profession is the low high school graduate rate, which lags the nation across all ethnic groups (Center for the Future of Arizona, 2007). Arizona fares particularly poorly with significantly higher HS dropout rates for Hispanics (15.2%), American Indians/Alaska Natives (19.0%), Whites (6.8%), and Blacks of the states that reported data (NCES, 2007). The overall dropout rate in Arizona is 10.5% compared to the national average of 9.4% (NCES). Dropout rates are also calculated by ‘event’ dropout rates for public high schools, which estimate the percentage of students who left HS between the beginning of one school year and the beginning of the next without earning a high school diploma or its equivalent (GED). State event dropout rates for 9th through 12th grade high school students ranged from 1.9% (Wisconsin) to the high of 10.9% in Arizona (NCES, 2007), the highest event dropout rate in the nation. There were 80,643 students enrolled in 8th grade in AZ schools in 2007. If the freshman graduate rate holds at 66.8%, only 53,870 of them can anticipate graduating from HS, a rate far below the national average (Table 5, p. 36).

RETENTION

When evaluating major barriers to nursing recruitment and retention in New York, Kirpal (2004) found that after an initial period of dedicated work and focused commitment to the profession, nurses used various strategies to retreat from nursing, including changing jobs, reducing hours, as well as temporarily or permanently leaving the profession to balance other commitments with their work life. The hospital environment itself is another important determinant of supply, providing a significant influence on workforce recruitment and retention. Hospital environment strategies to recruit and retain qualified nursing staff include: (a) the development of more efficient systems of delivering nursing care (Hassmiller & Cozine, 2006); (b) strong, visionary

nursing leadership (Herrin & Spears, 2007; Strachota, Normandin, O'Brien, Clary, & Krukow, 2003); (c) the implementation of professional practice models, such as shared governance or magnet hospital status (Pierce, Hazel, & Mion, 1996; Strachota et al.); (d) the opportunity for professional development and advancement (Buerhaus, et al., 2007); (e) attention to work intensity issues, including staffing and flexible scheduling, workloads and skill mix, and range of responsibilities (Brewer, Zayaz, Kahn, & Sienkiewicz, 2006); and (f) organizational promotion of teamwork, interdisciplinary collaboration, and patient safety (Buerhaus et al., 2007; McHaney & Varner, 2006). Institutions play a key role in creating optimal working environments for nursing personnel or, conversely, driving away nurses unwilling to work with diminishing institutional commitments (Clarke, 2004).

In order to address the effects of aging and the physical demands of 'bedside nursing,' several institutional strategies have been proposed in reconstructing the work environment to be more ergonomically sensitive. These include good lighting, adequate flooring that makes moving patients and large pieces of equipment / furniture easier, assistive devices for patient lifting, and adequate rest periods (Cooper, 2003; Norman et al., 2005), to name a few. Hospitals need to be mindful of the institutional work environment and transform the physical design to better meet the needs of the existing aging nursing workforce, reducing musculoskeletal injuries and decreasing the physical stress of providing direct patient care. Organizations must keep the future in mind, adopting "an unrelenting focus on improving the workplace environment so that RNs who enter the workforce . . . remain working, and those who are expected to retire in the years ahead are induced to postpone their retirement" (Buerhaus, Donelan, Ulrich, Norman, & Dittus, 2006, p. 11).

Recognizing the importance of environmental working conditions, several hospitals in Arizona have obtained or are seeking magnet status, part of a program developed by the American Nurses Credentialing Center (ANCC), a subsidiary of the American Nurses Association (ANA). Magnet recognition is given to hospitals that provide and foster nursing excellence through an assessment of the nursing environment, including visionary nursing leadership, autonomy over nursing practice, and evidence of professional practice and quality patient outcomes. The five magnet-designated hospitals in Arizona include Banner Good Samaritan Medical Center, John C. Lincoln North Mountain, Scottsdale Healthcare (Shea and Osborn), and the University Medical Center in Tucson. Several other hospitals are in the process of trying to achieve magnet designation, which is believed to signify a level of excellence that both attracts and retains quality nursing personnel.

Table 5. Projected Number of High School Graduates by County: Arizona*

<i>County</i>	<i>2008</i>	<i>2009</i>	<i>2010</i>	<i>2011</i>	<i>2012</i>	<i>2013</i>	<i>2014</i>	<i>2015</i>	<i>2016</i>	<i>2017</i>
Apache	615	752	899	791	815	695	613	596	639	646
Cochise	1,369	1,458	1,679	1,053	1,119	1,047	1,019	1,004	980	992
Coconino	1,460	1,595	1,982	1,006	924	927	961	935	929	949
Gila	428	442	480	475	430	413	392	388	414	434
Graham	487	579	560	299	329	278	280	285	325	322
Greenlee	77	81	77	82	94	92	98	90	94	100
La Paz	153	142	136	142	154	137	130	139	130	128
Maricopa	36,840	37,945	40,208	33,393	34,019	34,292	34,980	34,709	35,256	35,789
Mohave	1,325	1,445	1,506	1,503	1,512	152	1,460	1,422	1,425	1,417
Navajo	2,287	2,624	2,781	1,109	1,067	1,033	938	999	931	1,025
Pima	6,848	7,914	8,742	7,847	7,930	7,712	7,583	7,529	7,615	7,910
Pinal	2,075	2,433	2,774	2,132	2,299	2,295	2,374	2,352	2,345	2,526
Santa Cruz	491	572	647	613	548	522	571	536	540	556
Yavapai	1,613	1,768	1,816	1,397	1,536	1,505	1,474	1,433	1,393	1,365
Yuma	1,854	1,961	2,048	2,002	2,071	1,989	1,927	1,936	1,825	1,876
Total	57,922	61,711	66,335	53,844	54,847	52,089	54,800	54,353	54,841	56,035

Source:

a. Graduation rates estimated from U. S. Department of Education statistics for Arizona (NCES, 2007), indicating a graduation rate of 66.8% for freshmen students

b. Does not account for population growth; data is based off of existing enrolled students in each county in Arizona.

c. Drop out rates for students currently in HS (designated by the years 2008, 2009, and 2010) may be over-inflated since the same graduate rate was applied universally, even though they conceivably should experience a lower rate the closer they get to graduation.

ENTRANTS FROM NON-NURSING OCCUPATIONS

Although the nursing shortage is three times larger than the 2001 shortage, it is anticipated to be less severe than was originally forecast due to the unexpected increase of people born in the 1970s who are now entering the workforce (Auerbach et al., 2007; Auerbach, Buerhaus, & Staiger, 2007). At the time the first estimates were published, the cohorts born in the 1970s had a declining interest in nursing and the original model made two key assumptions: (a) future

cohorts will enter nursing at the rate of the five most recently observed cohorts (as of 1998); and (b) future cohorts will follow the same life cycle pattern of RN FTE production.

Nurses migrate to advance their own education, earn more money, provide for their families, and enhance their quality of life (Carney, 2005; Yearwood, 2007). Although the impact of nurse migration to more advantaged countries often creates gaps in the health care system in their country of origin, not all countries view the loss of the nursing workforce as detrimental. Nurses from the Philippines, for example, sent home nearly \$8 billion in 2004, helping generate foreign exchange and sustain the economy even though Filipino nurses who remained faced substandard conditions and little incentive from the government to improve working circumstances or wages (Bieski, 2007).

NURSING SCHOOL CAPACITY IN STATE

An additional deterrent to nursing school enrollment particularly pressing in Arizona is the recent state budget deficit (state fiscal year 2009) that hinders the ability of the state institutions to continue to admit a full cohort of undergraduate baccalaureate nursing students. At ASU, home to the largest college of nursing in the state and one of the largest undergraduate BSN programs in the country, plans to reduce admissions on the ASU Polytechnic Campus beginning in spring 2009 are already underway (pending approval by the Arizona Board of Regents). Barring unforeseen changes, ASU College of Nursing and Healthcare Innovation plans on additional reductions in admissions on the West Campus. With the proposed reductions on the Polytechnic and West campuses of ASU, undergraduate BSN enrollment will decrease from 300 per year to 220 per year by fall 2009.

The next section of this report addresses the supply of advanced practice nurses. They are included in the counts in the previous section to maintain comparability with other studies of RNs but are considered separately because their importance in certain specialty areas is quite different from that of other RNs.

Section IIB: Advanced Practice Nurses

Figure 9. The 2008 Renewals as a Sample of all Active APNs in Arizona

APNs with Active Arizona Licenses All States N = 3,369		
Arizona Address N = 2,965	Other States N = 387	Address Unknown N = 17
Renewed in 2008 N = 503	1st APN License in 2008 N = 101	Total APN renewals + First Time APN Licensure N = 604
Renewed in 2008 Actively employed in paid position in nursing N = 503 (100%)	Renewal in 2008 Provide direct patient care N = 455 (90.4%)	Renewal in 2008 Employed by AZ employer N = 497 * (6 frequency missing)

Source: ABON administrative data, 2008.

Advanced practice nurses include: nurse practitioners (NPs), certified nurse anesthetists (CRNAs), clinical nurse specialists (CNSs), and certified nurse midwives (CNMs). In assessing workforce needs relating to advanced practice nursing, there are roughly 240,500 RNs with advanced practice preparation nationwide (HRSA, 2004). These include clinical nurse specialists (n = 72,521), nurse practitioners (n = 141,209), nurse anesthetists (n = 32,523), and certified nurse midwives (n = 13,684). Arizona has 158 Clinical nurse specialists (ABON, 2008), translating to 2.45 CNSs per 100,000 population. The advanced practice workforce in Arizona fares better than the RN or LPN workforce, with more than 3,100 nurse practitioners (ABPN, 2008). With 41 NPs per 100,000 in 2000, Arizona had a rate higher than the national average of 34 NPs per 100,000 population. The state's number of NPs per 100,000 is currently 48 per 100,000.

Arizona's APNs are predominantly Caucasian (88%), followed by Hispanic (5.4%), Asian (2.5%), African American (1.9%), and Native American (1.2%), with the remaining 1% identified

as 'other' or 'multi.' Only 19 responses were missing from the sample, reflecting less than 1% of eligible respondents.

There were 258 certified nurse midwives in Arizona in 2000, representing 5 CNMs per 100,000 population, exceeding the national rate of 3 per 100,000 (HRSA, 2004) and placing Arizona 7th among all states. Arizona now has 209 midwives, translating to 3.24 CNMS per 100,000 and illustrating their declining numbers per capita in the state. In 2000, the rate of certified nurse anesthetists per capita was among the lowest for all U.S. states with 3.3 nurse anesthetists per 100,000 compared to 9.3 / 100,000 nationally. Current data from the most recent Arizona license renewal indicates Arizona has 560 nurse anesthetists, equating to 8.7 per 100,000 and approaching national norms. Despite the relative stability of advanced practice nurses, Arizona ranks 49th among states per capita in overall health services employment (HRSA, 2004).

In assessing Arizona's advanced practice nursing (APN) workforce, there are diminishing numbers of certified nurse midwives, declining from 5 CNMs per 100,000 population in 2000 to the current rate of 3.24 per 100,000 population. The number of clinical nurse specialists (CNSs) in Arizona falls far below the overall national rate—there are 72,532 clinical nurse specialists in the U.S., equating to 238 CNSs per 100,000 population. With only 158 CNSs (ABON, 2008), Arizona has 2.45 CNSs per 100,000, a difference of nearly 100 times fewer clinical nurse specialists per capita. The numbers of certified registered nurse anesthetists (CRNAs) approach the national norm of 9.3 CRNAs per 100,000: Arizona has 560 CRNAs, or 8.7 CRNAs per 100,000. The nurse practitioner (NP) workforce is the most robust of APNs with more than 3,100 NPs, or 48 per 100,000. The national average for NPs per 100,000 is 34. Despite the relative stability of NPs, Arizona ranks 49th overall among states per capita in overall health services employment (HRSA, 2004).

Assuming the characteristics of APNs who renewed in 2008 represent all active Arizona APNs, the most frequently identified areas of clinical practice (excluding the category 'other' at 36.2%) were 'obstetrics' and 'special care' at 13.2% each. The next most frequently identified clinical area was 'pediatrics' at 9.2%, followed by 'medical / surgical' (7.6%), psychiatric / mental health (7.2%), 'geriatrics' (6.8%), 'generalized community health' (5.8%), and 'informatics' and 'telehealth' both at 0.4%. Due to the data collection methods employed at the Board of Nursing, it is not known how the respondents are distributed among Clinical Nurse Specialists, Nurse Practitioners, Certified Registered Nurse Anesthetists, or Certified Nurse Midwives in relation to clinical area(s).

The majority of APNs report working in direct patient care (92.5%). Over three-fourths (76.2%) work at least 36 hours/week, and of those 38% work more than full time (defined as ≥ 41 hours/week). Most (92%) work at least 10 months out of the year and do not carry multistate APN licensure (99.6%). Nearly 70% (69.19%) are 45 years or older, reflecting the large pool of active advanced practice nurses who will collectively reach retirement within the next 10-15 years.

Consistent with the RN workforce, the majority of APNs are employed in Maricopa County (59%), followed by Pima (21%), and dropping to the next largest APN workforce in Coconino County at less than 5%. Nearly 30% of APNs list their employment setting as either ambulatory care (29%) or the hospital setting (29%). "Other" accounted for an additional 23.6%, followed by public / community health (5.7%), long term care (4.9%), nursing education (3.9%), home health (1.4%), and the remaining employment settings (occupational health, school health, and insurance companies) representing 1% or less of the APN workforce.

Nurse Practitioners are an important source of increases in productivity in the provision of direct patient care. An additional set of data from the next renewal cycle will be needed to more adequately predict the likely attrition rate and net increase or decrease in the supply of nurse practitioners in Arizona.

Section IIC: Licensed Practical Nurses

Figure 10. The 2008 Renewals as a Sample of all Active LPNs in Arizona

LPNs with Active Arizona Licenses 2008 All States N = 11,382			
Arizona Address N = 10,493	Other States N = 667	Address Unknown N = 222	
Renewed in 2008 N = 1,301	Eligible but did not renew 2008 N = 824	New LPN applicants with 2008 N = 1,005	AZ LPN graduates 2008 N = 336

Source: ABON survey data, 2008

Introduction

The number of LPN programs in the U.S. has remained stable since the 1990s but the annual number of graduates has declined. The decline in graduates has, however, been more than offset by remaining in the workforce for longer periods. Practical Nursing program enrollments in Arizona increased by 6% between 2005 and 2006. For the first time, in 2006 there were qualified students (171) that were not admitted to a practical nursing program, which persisted into 2007 (213 qualified applicants were not admitted). Prior to 2005, no qualified student who applied to an LPN program in Arizona was denied admission (ABON, 2007). There appears to be an increased demand for LPN programs in Arizona as reflected in the increasing number of qualified students who are not admitted, although the most common reason for students to enroll in a terminal practical nursing program is to gain advanced placement admission to an RN program (Randolph, 2006).

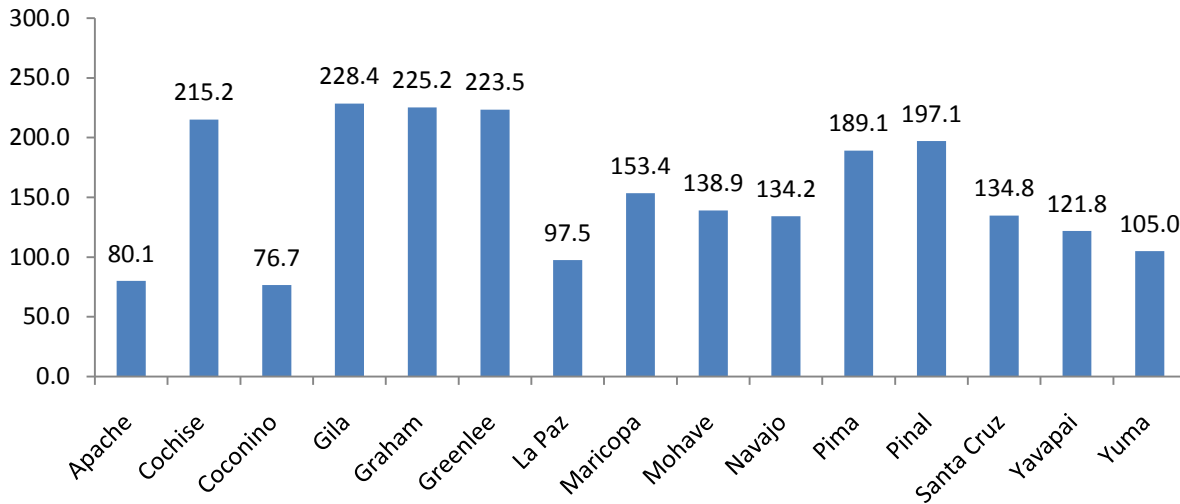
There were 1,005 new LPN licensees in 2008, of which 336 LPNs graduated from one of the Arizona LPN programs (East Valley Institute of Technology, Estrella Mountain Community College/ Southwest Skill Center, Gateway Community College, Maricopa Skill Center, and Pima Community College). The pool of new LPN licensees in Arizona included 400 LPNs who passed the LPN boards from multiple exit RN programs (some RN programs allow the students to take

the LPN boards so they can work as an LPN while completing their RN degree). Additionally, there were 47 LPN re-entry graduates. Hence, the number of total LPNs who take the exam is about double the number of graduates from the state's LPN programs. In addition, there were 824 eligible LPNs who did not renew their licenses in 2008. Because of a considerable number of missing responses for the LPNs who did not renew their license (up to 90% in demographical information), it is not feasible to make any assumptions on their characteristics. It is worth noting, however, that this number represents a significant portion of the renewal pool and may reflect an unusual shift in LPNs who are leaving the workforce in Arizona, or may reflect errors in the data collection process. No projection was made for LPNs due to the lack of information from previous years.

The 2008 Renewals as a Sample of all Active LPNs in Arizona

Out of 2,306 survey participants who have active license, 1,388 actively work as LPNs, followed by 891 cases with unknown employment status, 10 cases employed but not as a LPN, and 17 cases are unemployed or retired. These unemployed or retired cases are excluded from the survey by the preset logic in the online questionnaire. In reviewing the characteristics of the 2008 survey participants compared to all active LPNs in Arizona, there is considerable consistency in distribution of age, gender, ethnicity, marital status, geographic area and clinical area (Appendix Table B1). The comparison shows less than 5% across all subcategories between two groups and this means that there is no significant difference between the LPNs with an active license in Arizona and the survey respondents of 2008 Arizona LPN survey. Thus, the survey respondents are considered as a reasonable representative of all LPNs with active licenses in Arizona.

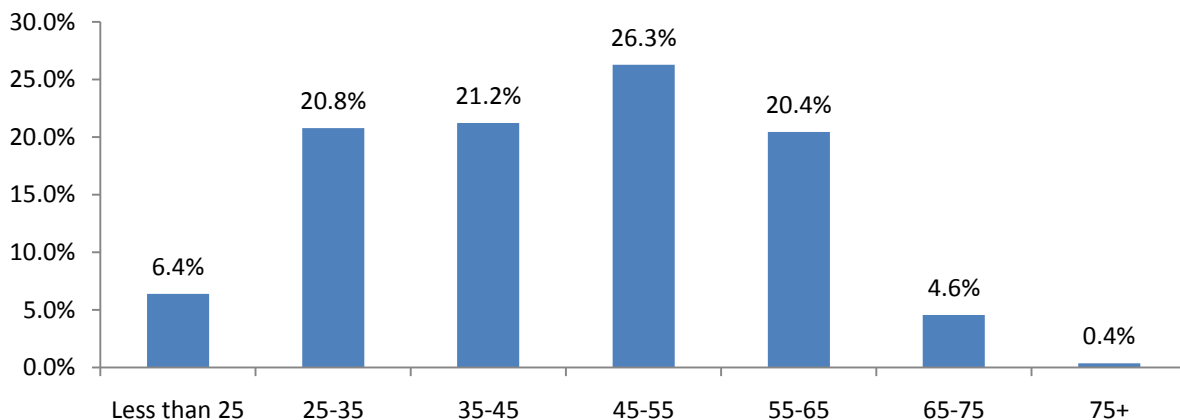
Figure 11. LPNs with Active Licenses per 100,000 Residents by County, Arizona, 2008 (N = 10,445)



Source: ABON survey data, 2008

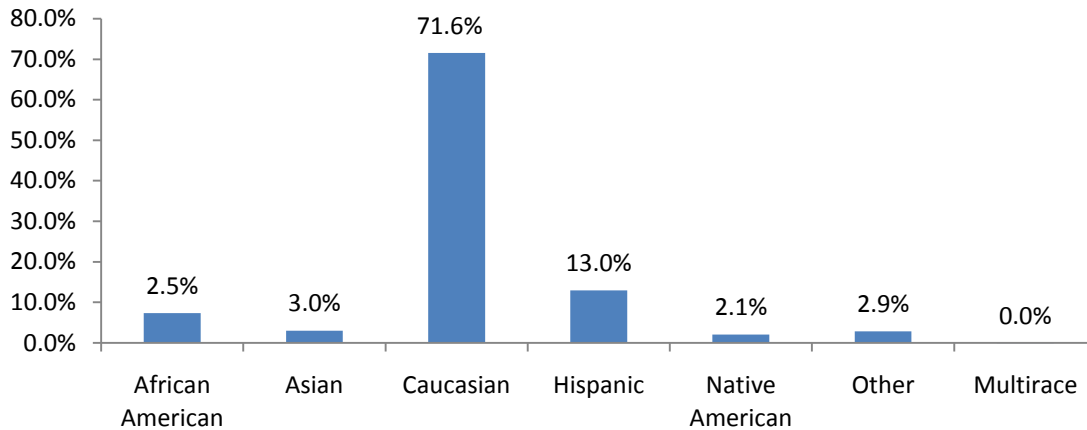
The majority of LPNs (58.3%) works in Maricopa County, followed by Pima (18.3%), Pinal (6.6%), and Cochise County (2.9%). Figure 11 shows the ratio of LPNs with active license per 100,000 residents by county in Arizona. Some counties in rural areas seem to have higher ratio of LPNs per 100,000 residents and this may compensate the inadequacy of nursing services for the counties in rural area.

Figure 12. Percent of LPNs with Active Licenses by Age Group, Arizona, 2008 (N = 10,493)



Source: ABON survey data, 2008.

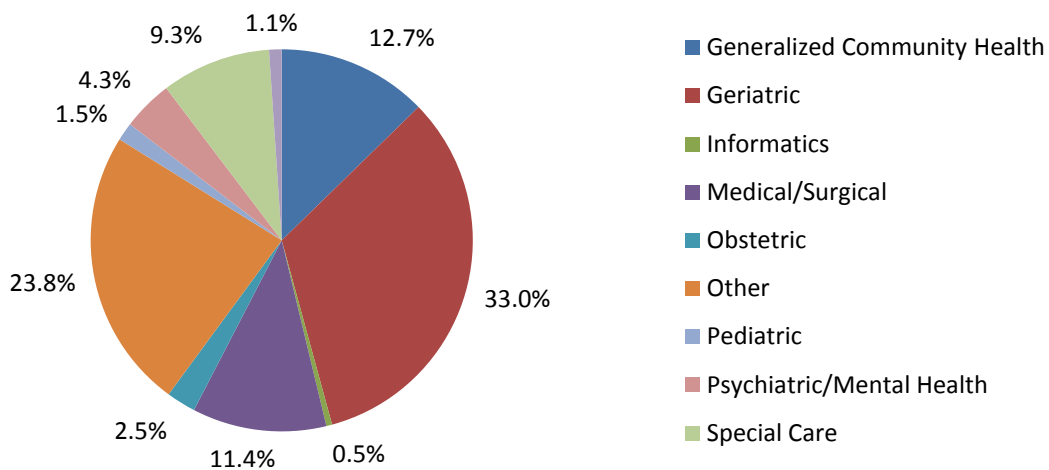
Figure 13. LPNs with Active Licenses by Race/Ethnicity, Arizona, 2008 (N=9,319)



Source: ABON data, 2008.

The majority (88.7%) of LPNs are female, of which 54.7% are married. The age distribution of LPNs with active licenses in Arizona during 2008 is displayed in figure 12. The majority of LPNs distributed almost evenly across age groups from 25 to 65 years of age. About 72% of the LPN workforce is Caucasian, followed by Hispanics (13%), Asians (3%), and Native Americans (2.1%). Most of LPNs have some formal training and about 6% LPNs have Baccalaureate degree or above, but almost one fourth (26.7%) of LPNs do not have degree or diploma.

Figure 14. LPNs with Active Licenses by Clinical Area, Arizona, 2008 (N=5,943)



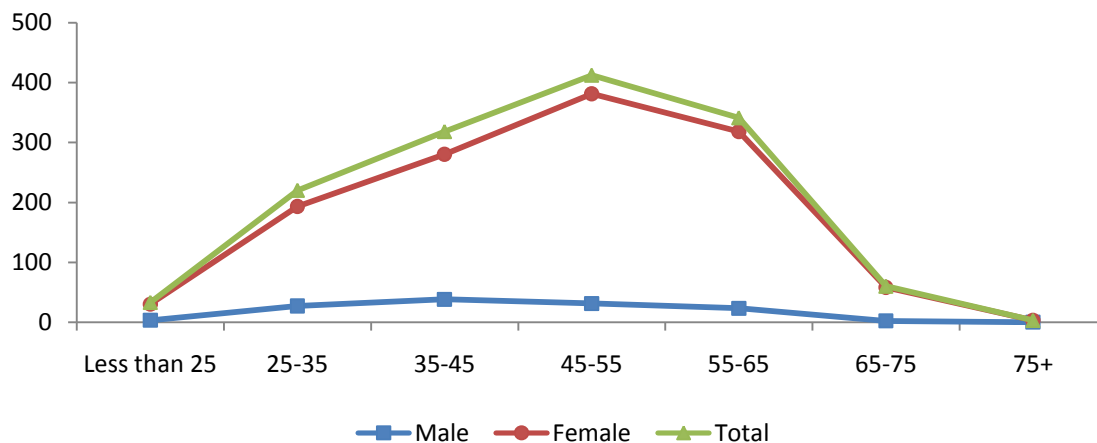
Source: ABON data, 2008.

Figure 14 shows that the majority of Arizona LPNs working in the clinical area have employment in geriatrics (33.0%), a sharp contrast to the RNs employed in Arizona in 2008 (where only 4.5% report this as their primary clinical area). The next large areas for all active LPNs include other (23.8%), generalized community health (12.7%), Medical/Surgical (11.4%), and informatics (9.3%) respectively.

LPNs Employed by an Arizona Employer

The characteristics of active LPNs with active licenses and employed in Arizona are derived from LPN survey 2008 as follows:

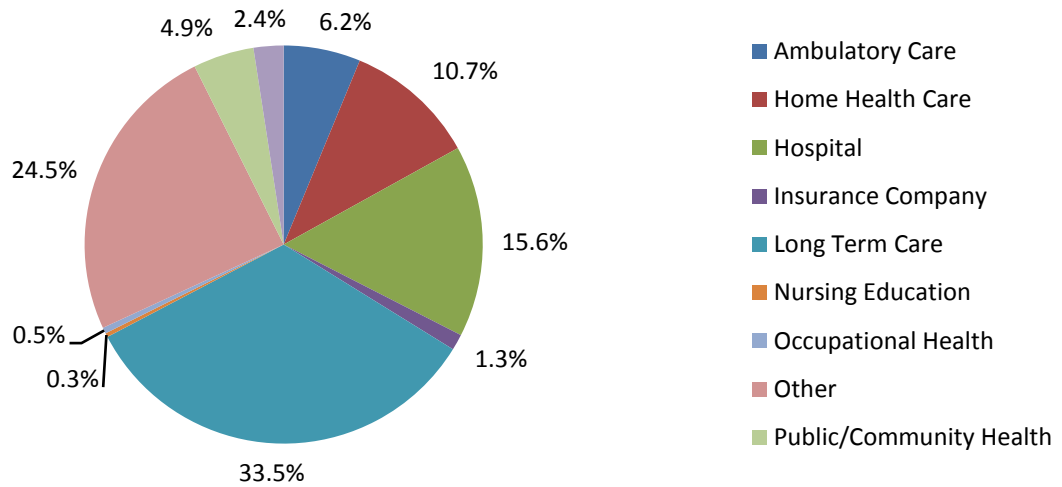
Figure 15. Number of Active LPNs by Age Group and Sex, Arizona, 2008 (N=1,387)



Source: ABON survey data, 2008.

Overall, 91.1% of active LPNs are female. The age distribution of active LPNs by sex shows that more female and younger LPNs live in Arizona (Figure 15). Male LPNs tend to be younger (mean age = 44.5) than female LPNs (mean age = 47.8).

Figure 16. Distribution of Active LPNs by Current Employment Setting, Arizona, 2008 (N=1,233)

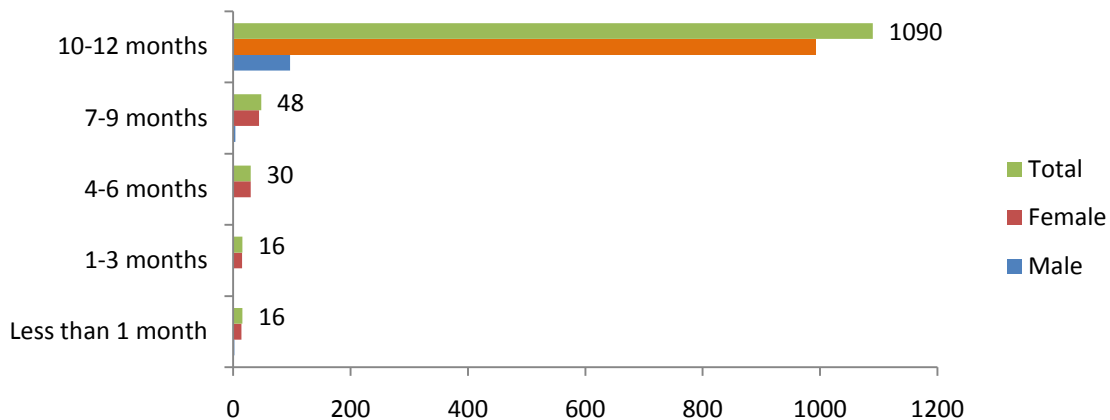


Source: 2008 ABON Survey

Figure 16 shows that the most frequent employment settings in which LPNs work are long term care (33.5%), followed by hospital (15.6%), home health care (10.7%), and ambulatory care (6.2%). The positions are most likely to be reported as general staff nurse (66.7%), other (19.6%), or nurse manager (5.1%).

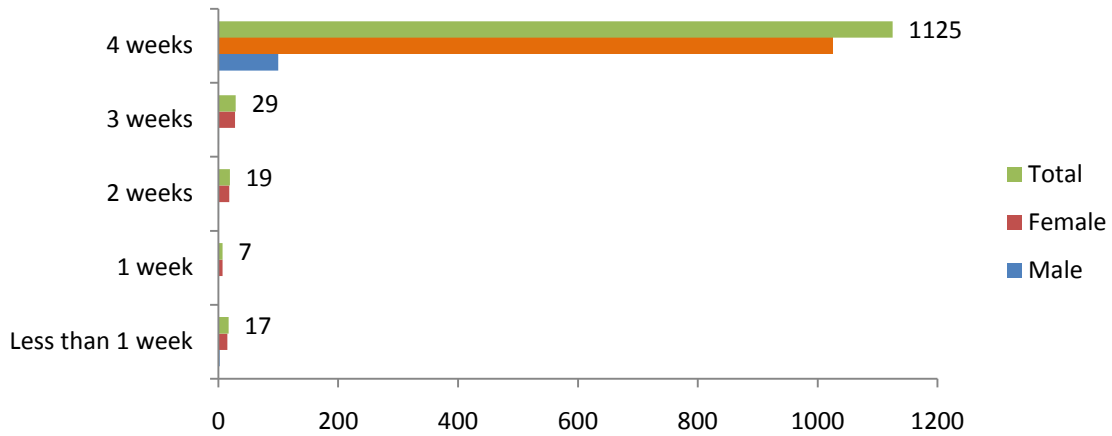
Converting Numbers of LPNs to Supply of Pharmacy Services

Figure 17. Number of Months Worked among Active LPNs per Year by Sex, Arizona, 2008 (N =1,200)



Source: ABON survey data, 2008.

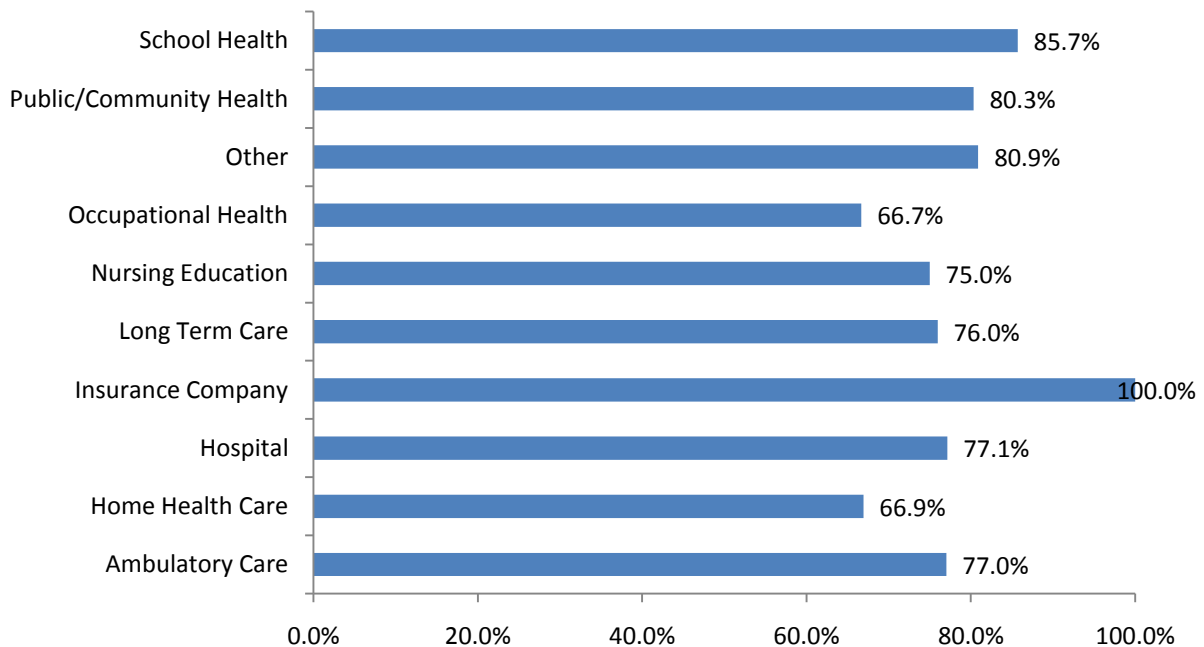
Figure 18. Number of Weeks Worked among Active LPNs per Month by Sex, Arizona, 2008 (N =1,197)



Source: ABON survey data, 2008.

Almost 90% of active LPNs work 10-12 months and 94% active LPNs usually work 4 weeks a month during the last 12 months (Figure 17 -18). About 77% of active LPNs work full-time in Arizona. Averagely, LPNs work 1676 hours per year.

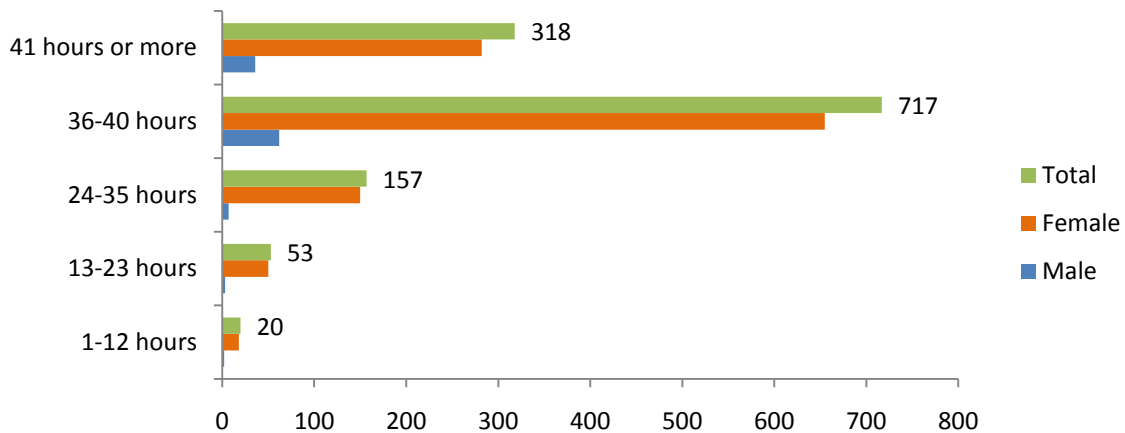
Figure 19. FTE Active LPNs by Employment Setting, Arizona, 2008 (N=1,185)



Source: ABON survey data, 2008.

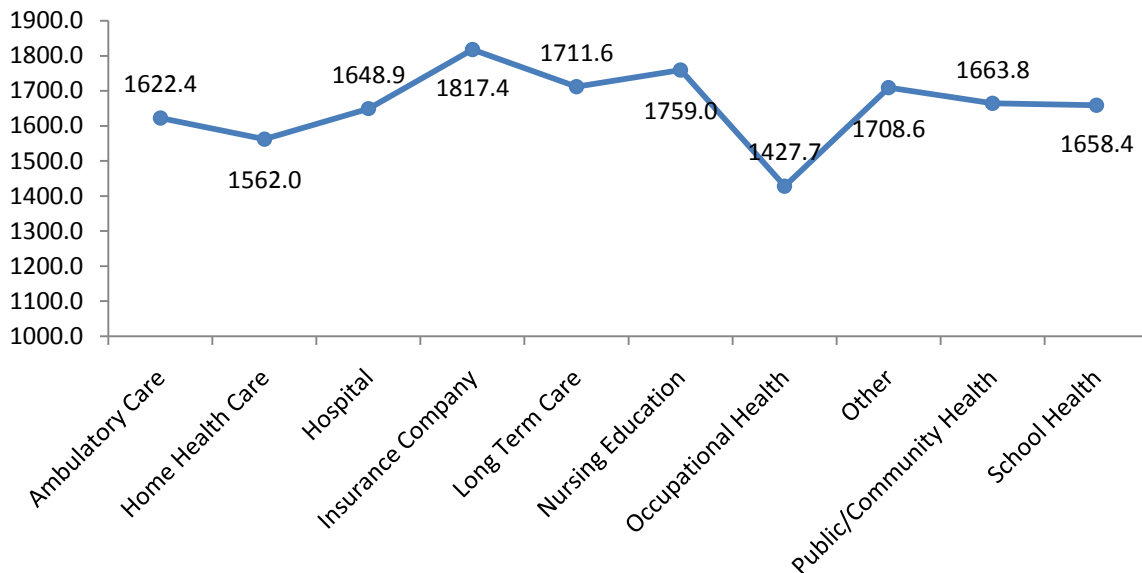
Figure 19 shows that active LPNs working in insurance company, school health and public/community health are more likely to work as full time employees.

Figure 20. Number of Working Hours among Active LPNs by Sex, Arizona, 2008 (N =1,265)



Source: ABON survey data, 2008.

Figure 21. Average Number of Working Hours among Active LPNs by Employment Setting, Arizona, 2008 (N =1,185)



Source: ABON survey data, 2008.

About 25% active LPNs usually work 40 hours or above per week during the last 12 months (Figure 20). The LPNs who work in the insurance company, nursing education, and long term care are more likely to work longer hours (Figure 21).

Renewals and First Time Licenses

Of 10,493 LPNs with active license living in Arizona, 2,306 LPNs obtained active license during 2008 either through license renewal process (1,301) or application of new Arizona license (1005).

Summary

According to the data from Arizona State Board of Nursing, the LPNs employed in Arizona represent almost two-third of the total nursing workforce compared to the number of RNs. LPNs serve an important role on the health care team. About 89% of LPNs are female. The majority of LPN workforce is Caucasian (72%), followed by Hispanics (13%), Asians (3%), and Native Americans (2.1%). LPNs are more likely to work in the clinical areas including geriatrics (33.0%), generalized community health (12.7%), Medical/Surgical (11.4%), and informatics (9.3%) respectively. LPNs tend to work in long term care (33.5%), hospital (15.6%), home health care (10.7%), and ambulatory care (6.2%). LPNs are usually employed in the positions as general staff nurse (66.7%) or nurse manager (5.1%). Active LPNs working in insurance company, school health and public/community health are more likely to work as full time employee. The LPNs who work in the insurance company, nursing education, and long term care are more likely to work longer hours. With the aging population and a significant number of seasonal elderly Arizona residents (elderly who live in Arizona during the winter months, i.e. “snowbirds”), the contribution of the LPNs is significant in managing and caring for this aging population.

Part III. Pharmacy Workforce

Section IIIA: Overview

Background

Pharmacy is the third-largest health care workforce in the U.S. after nurses and physicians. The demand for pharmacy services has outpaced the level of services supplied by pharmacy workforce (Cooksey JA. 2002). The projected employment for pharmacists in U.S. will increase by 21.7% within 10 years, from 243,482 in 2006 to 296,364 in 2016 (U.S. Census Bureau 2006). In addition, the shortage of pharmacists in the rural areas becomes more apparent (DHHS, HRSA 2004). Studies on the pharmacy workforce predict a continuing shortage of pharmacists with reporting persistent vacancy rates and difficulty in pharmacist workforce recruitment and retention (AHSP 2007; HRSA 2000; HRSA 2008; Knapp DA. 2002; Knapp KK. 2003; Knapp KK. 2007; National Rural Health Association 2005; Western Interstate Commission for Higher Education 2008).

The shortfall of pharmacists is related to the dynamic imbalance of demand and supply for pharmacy services (Knapp DA. 2002; Knapp KK 2003; Manasse HR 2007; Mott DA. 2002; Walton SM. 2003). The increasing demand comes from the growing and aging population, growth in prescription medication use, and evolving role of pharmacists with more responsibility on disease medication management and patient counseling (Cooksey JA. 2002; HRSA 2006; McGinnis SL. 2006; Pedersen CA. 2006; Pedersen CA. 2007). Factors influencing the supply of pharmacy services include the changes in the demographics of the pharmacist workforce, expanding capacity of training and enrollment in pharmacy education system, improved work efficiency due to usage of new technologies for dispensing prescriptions, declining job satisfaction due to increasing administrative and dispensing workloads, and an expanding role of pharmacy technicians/aids (Academy of Managed Care Pharmacy. 2003; ASHP Task Force on Pharmacy's Changing Demographics.2007; Mott DA. 2006; Edwards JM. 2002; Knapp KK. 2007; Walton SM. 2007).

The United States population is projected to add 50 million people between 2000 and 2020 (U.S. Census Bureau). The first wave of baby boomers will begin enrolling in Medicare in 2011 and many elderly people require medication therapy as part of their health care.

To examine if the pharmacy workforce is adequate to meet the increasing needs of pharmacy services in Arizona, AzHHA and ASU's Center for Health Information and Research (CHIR) initiated the first Arizona pharmacy workforce study project in 2008. The project includes licensing cycles one and two, years 2008 and 2009. The objectives of the study are to:

- Compile and analyze pharmacy workforce licensure data and surveys completed by renewal pharmacists and pharmacy technicians in Arizona;
- Describe the characteristics and estimate future projection of pharmacist workforce in Arizona;
- Examine whether there is a shortage of pharmacists in Arizona;
- Assess the pharmacy workforce status by geographic area;
- Analyze the factors related to pharmacy workforce career development;
- Identify pharmacist workforce issues and provide quantitative information for decision-makers in workforce policy.

Methods

Data in this report were derived from pharmacist and pharmacy technician licensure databases and online surveys completed by pharmacists who renewed their licenses during September through November of 2008. The databases were housed by the Arizona State Board of Pharmacy (ASBP).

The licensure data are analyzed to provide the baseline statistics to measure current pharmacy workforce in Arizona and to describe characteristics including age and gender distribution, and years of experience after graduation by geographic area. The forecasting model is applied to project the future pharmacy workforce supply in the next decade.

The survey data are linked to the licensure database using license IDs to connect the two. The linked data are analyzed to examine the association between the characteristics of the pharmacy workforce and employment status, work patterns, and factors affecting career choices.

Ratio Measures

Ratios were calculated using the number of pharmacists with active licenses or pharmacy technicians with active licenses per 100,000 residents.

Full Time Equivalent Measures

HRSA defines a full time equivalent (FTE) pharmacist or pharmacy technician as one who works, on average, approximately 1,890 hours per year (40 hours per week times 47.2 weeks per year). In the survey, three questions were asked to estimate the approximate time that a pharmacist or pharmacy technician worked during the last 12 months. The selection options for the questions on the number of months and hours are provided as intervals, thus a 40 hour per week, 47.2 weeks per year person will have reported total hours as the midpoint of the 10-12 month answer (11 months), 4 weeks per month and the midpoint for hours 40-49 (45 hours). With the consideration of a two week vacation for a full-time employee, the calculated total hours would be $11 \times 4 \times (45-2) = 1,892$. Thus 1,890 hours will work as the measure of full time hours.

Forecasting Models

The average annual change in the numbers of pharmacists with active licenses who live in Arizona during 2000 – 2008 will be used to project the number of pharmacists for the future years. The method of least squares was applied for liner model projection of the number and ratio of pharmacists with active licenses living in Arizona. The number of FTEs for future years cannot be projected in this report due to the lack of information on FTEs in previous years.

Determinants of Supply

- New graduates and training capacity
- Increasing number of women in pharmacy
- Pharmacist hours worked

The Data Collection Process

The data collection includes two components: the licensure database from the ASBP and 2008 online surveys among the pharmacists and pharmacy technicians who renewed their licenses.

Licensing Cycles

The ASBP requires that pharmacists and pharmacy technicians renew their licenses every other year.

Section IIIB: Pharmacists

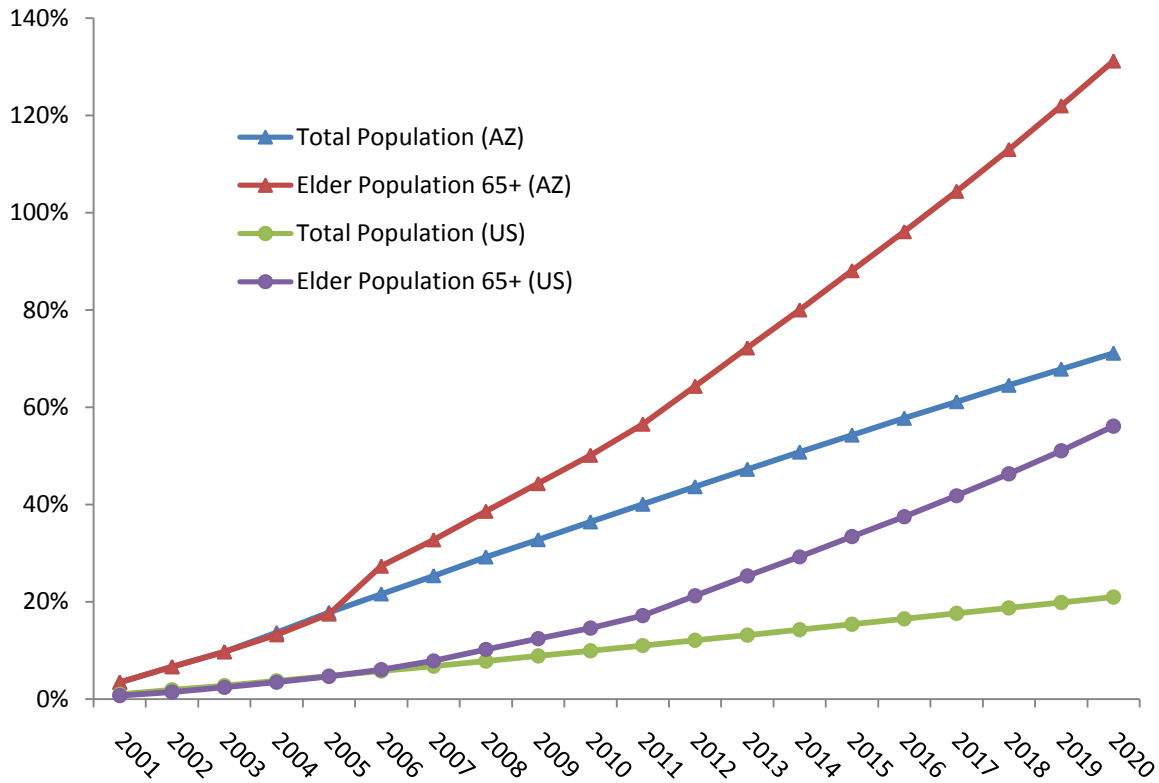
Introduction

A total of 5,486 pharmacists with active licenses live in Arizona. Currently, Arizona has two pharmacy schools that both provide Doctor of Pharmacy or PharmD degrees for pharmacist education. The ratio of active pharmacists per 100,000 residents in Arizona is 79.4, compared to 79.5 for the United States. The Aggregate Demand Index (ADI) for Arizona decreased from 4.17 in February of 2007 to 3.43 in July 2008, indicating that the pharmacist workforce was in moderate excess demand in early 2007 and then more closely reached a balance between supply and demand in the middle of 2008.¹

The demand for pharmacists is expected to grow substantially in Arizona. The population of Arizona has increased more rapidly than the growth in all but a few states. Arizona's population increased from 5,130,632 in 2000 to 6,534,921 in 2008. Arizona's elderly population has increased 27% within eight years, increasing from 667,839 in 2000 to 849,677 in 2008 (Figure 22.). In the future, baby boomers retiring in the next three decades are more likely to move to Western states such as Arizona in disproportionate numbers. People above 65 years old consume almost twice the number of prescription drugs as younger persons (The Kaiser Family Foundation 2001). In addition, as reported in the physician and nursing workforce sections, there is a shortage of physicians and nurses in Arizona. This shortage of health care professionals will accelerate the demand for pharmacists to become more involved in medication therapy management.

¹ The Pharmacy Manpower Project Inc. developed the Aggregate Demand Index (ADI), which is a monthly national survey completed by panelists to estimate the level of difficulty filling open pharmacy positions at the state, regional, and national levels and by pharmacy position type based on five-point scale with 5 as "High demand, difficult to fill open positions", 3 as "Demand is in balance with supply" and 1 as "Demand is much less than the pharmacist supply available" (Knapp KK. 2002).

Figure 22. Population Growth Rate for All Residents and Residents over Age 65, Arizona & US, 2000-2020

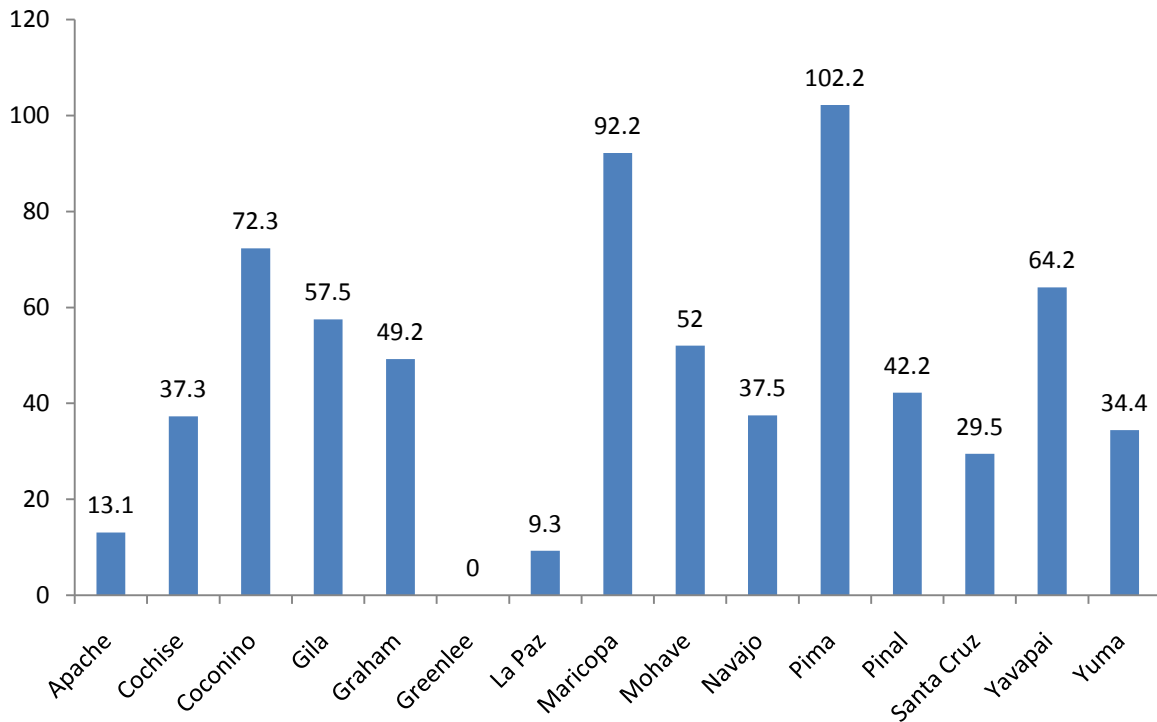


Source: U.S. Census of Bureau and Arizona Department of Economic Security

The 2008 Licensees as a Sample of All Active Pharmacists in Arizona

Appendix Table C3 shows the age distribution, years of experience, employment setting, and education background of pharmacists with active licenses and the survey participants. It shows that there is no significant difference between the pharmacists with active licenses who live in Arizona and the 2008 survey respondents. This means the survey respondents are reasonably representative of all pharmacist with active licenses who live in Arizona.

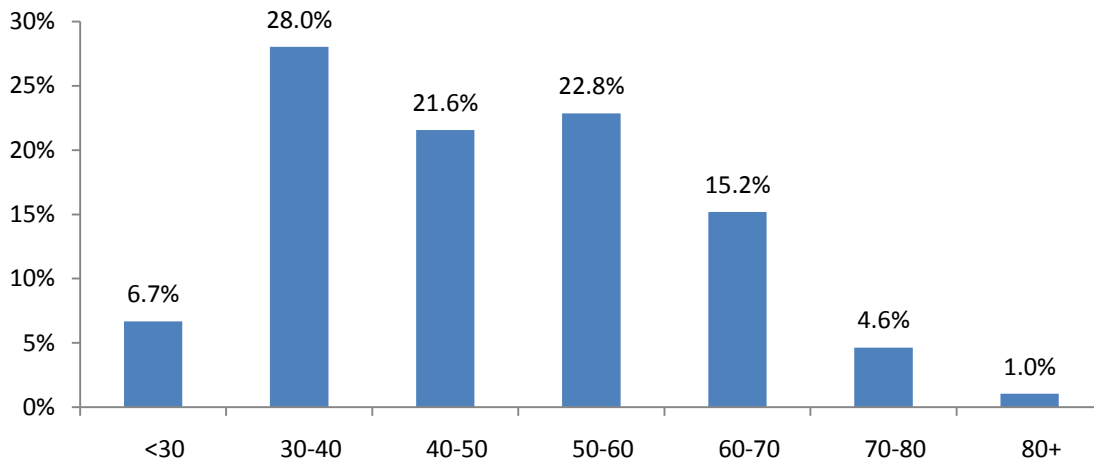
Figure 23. Pharmacists with Active Licenses Who Live in Arizona per 10,000 Residents, by County, 2008 (N = 5,454)



Source: Pharmacist Licensure Database, February 2009

Figure 23 shows the ratio of pharmacists with active licenses who live in Arizona per 100,000 residents by county. Pima County has the highest ratio of pharmacists per 100,000 residents (102.2). This reflects employment in several big hospitals, the positions available for pharmacists at the College of Pharmacy, and the medical school of University of Arizona. About 67% of active pharmacists reside in Maricopa County and the ratio is much higher than that of Arizona or U.S. However, the ratio varies significantly among the counties, revealing the inadequate supply of pharmacist for the counties in rural areas.

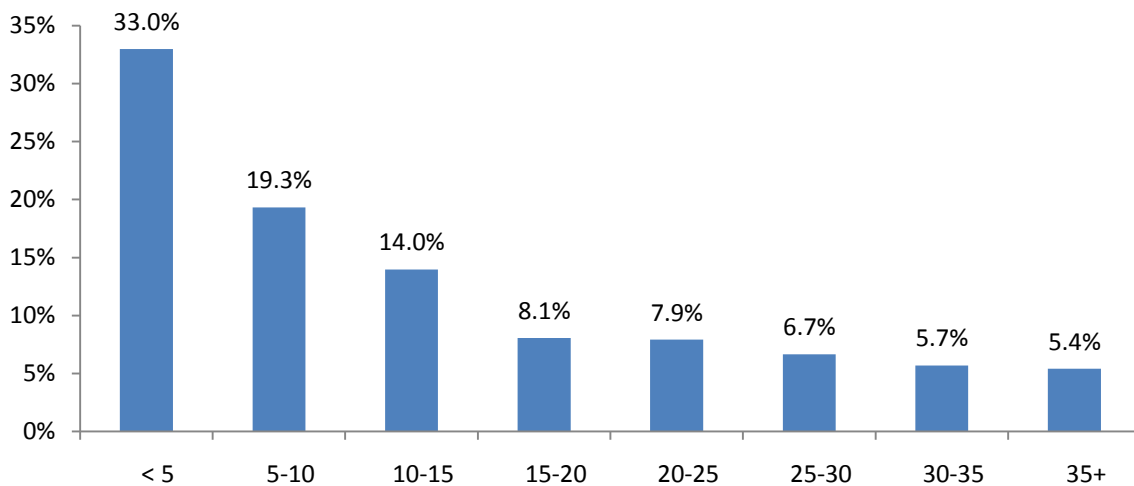
Figure 24. Percentage of Pharmacists with Active Licenses Who Live in Arizona by Age Group, 2008 (N = 4,784)



Source: Pharmacist Licensure Database, February 2009

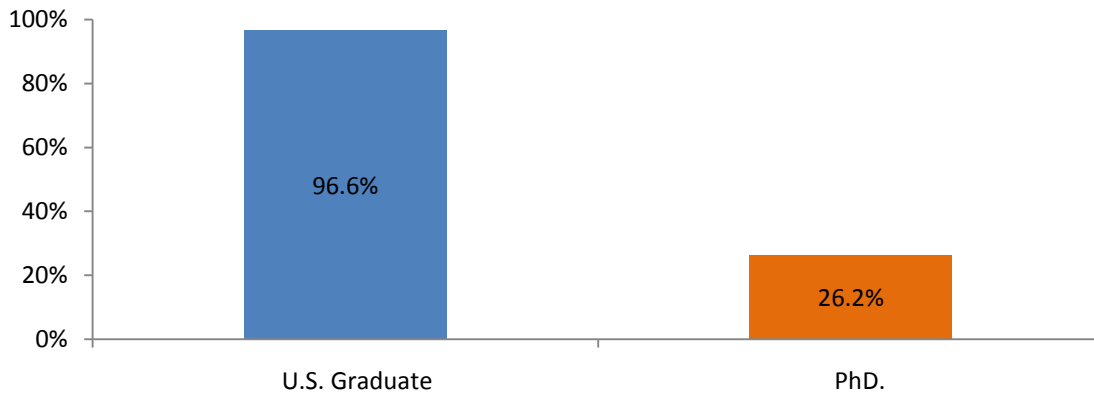
Figure 24 shows the age distribution of Pharmacists with active licenses living in Arizona. In 2008, slightly more than 20% of the pharmacists with active licenses are 60 years of age or older .

Figure 25. Percentage of Pharmacists with Active Licenses Who Live in Arizona by Years of Experience, 2008 (N = 5,483)



Source: Pharmacist Licensure Database, February 2009

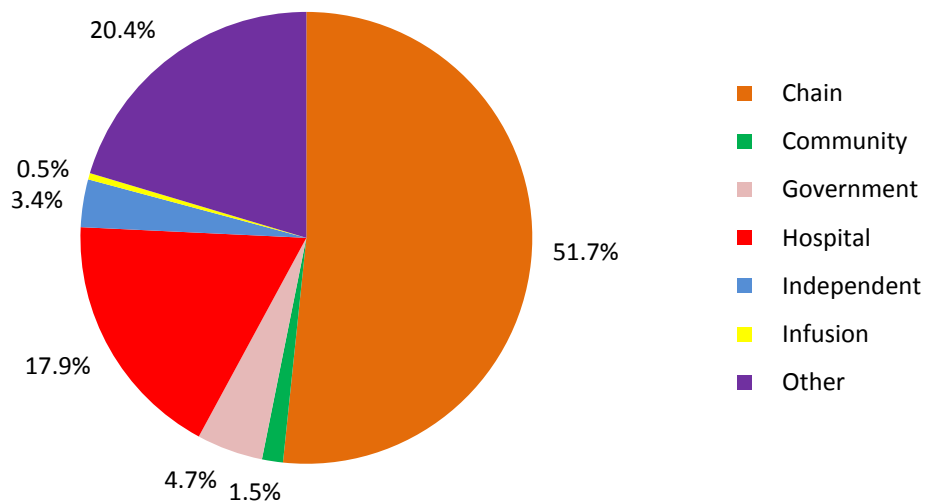
Figure 26. Percent age of Pharmacists with Active Licenses Who Live in Arizona by Education, 2008 (N = 4,852)



Source: Pharmacist Licensure Database, February 2009

Figure 25 shows that about one-third of pharmacists with active licenses who live in Arizona have less than 5 years of work experience. Of all the current active pharmacists in Arizona, 26.2% have a doctoral degree and 96.6% obtained professional education in the U.S. (Figure 26).

Figure 27. Percentage of Pharmacists with Active Licenses Who Live in Arizona by Employment Sector, 2008 (N = 4,856)



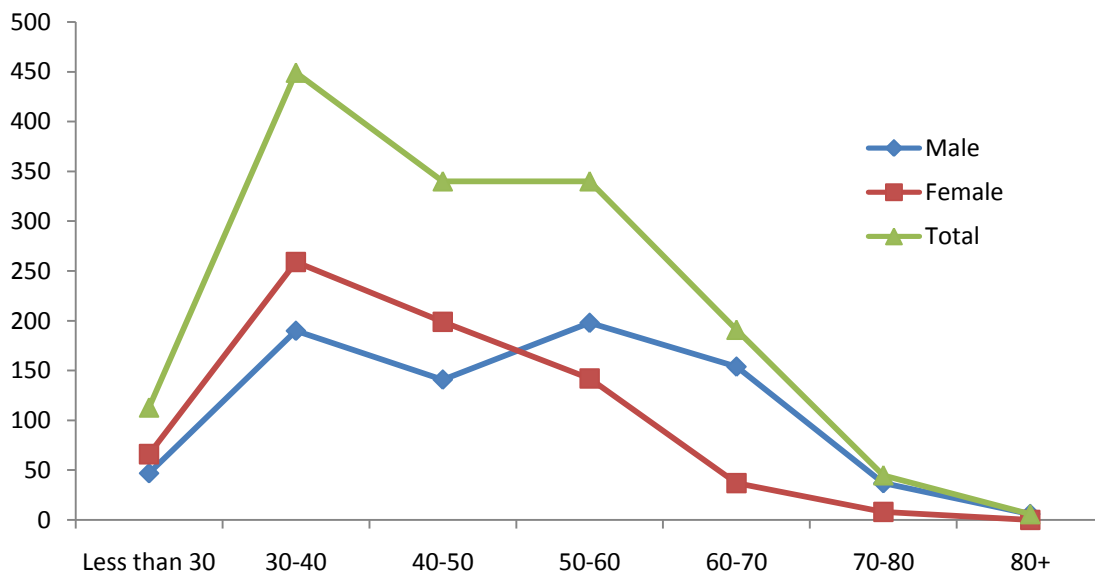
Source: Pharmacist Licensure Database, February 2009

Approximately 51.7% of pharmacists with active licenses who live in Arizona work in retail chain pharmacies. The second largest group (17.9%) is employed by hospitals.

Pharmacists Employed by an Arizona Employer

Approximately 4.2% of the pharmacists (102 cases) are unemployed. The unemployed pharmacists are excluded from the survey by the preset logic in the online questionnaire. There are 430 cases who self-reported as employed as pharmacists. However, these 430 cases did not answer any of the following questions in the survey and there is not enough information to make assumptions regarding their answers for the following survey questions. Thus, those 430 cases will be treated as survey non-respondents vs. 1,870 survey respondents and the survey response rate is 80.6% (1,870/2,320) among active pharmacists. The survey was conducted from October through November in 2008, during which a total of 2,831 pharmacists renewed their licenses. The survey response rate was 66% (1,870/2,831) among pharmacists with active licenses regardless their working status. Thus, 2008 pharmacist survey results are considered as valid to provide a relatively accurate representation of surveyed population. The characteristics of active pharmacists living in Arizona from the 2008 survey are as follows:

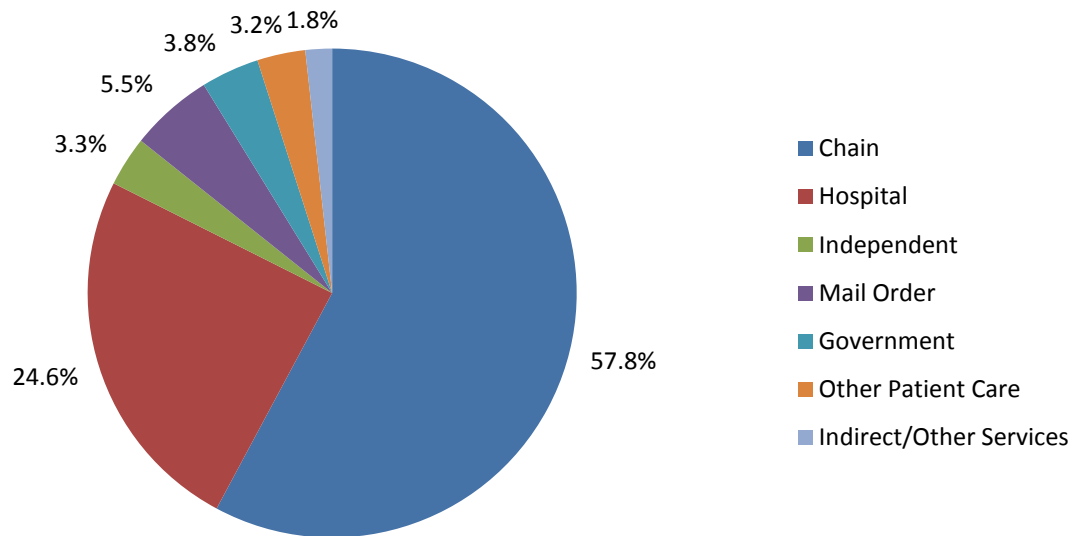
Figure 28. Number of Active Pharmacists by Age Group & Gender, Arizona, 2008 (N = 1,484)



Source: Pharmacist Licensure Database, February 2009

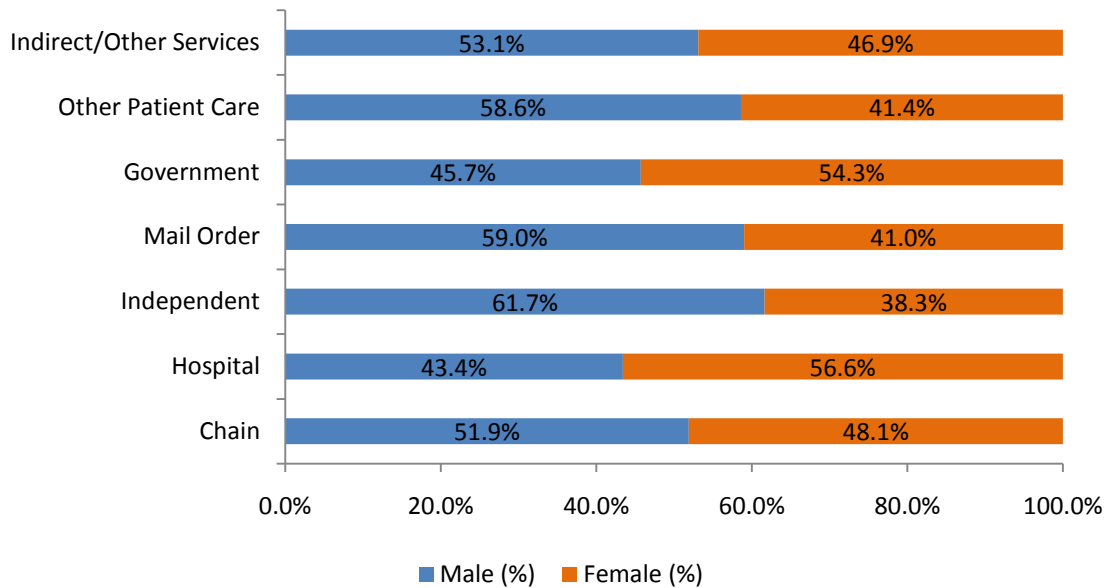
Figure 28 shows the overall numbers of female and male active pharmacists are almost equal. Male pharmacists tend to be older (mean age = 49.7) than female pharmacists (mean age = 42.8).

Figure 29. Distribution of Active Pharmacists by Current Employment Setting, Arizona, 2008 (N = 1,819)



Source: Pharmacist Licensure Database, February 2009

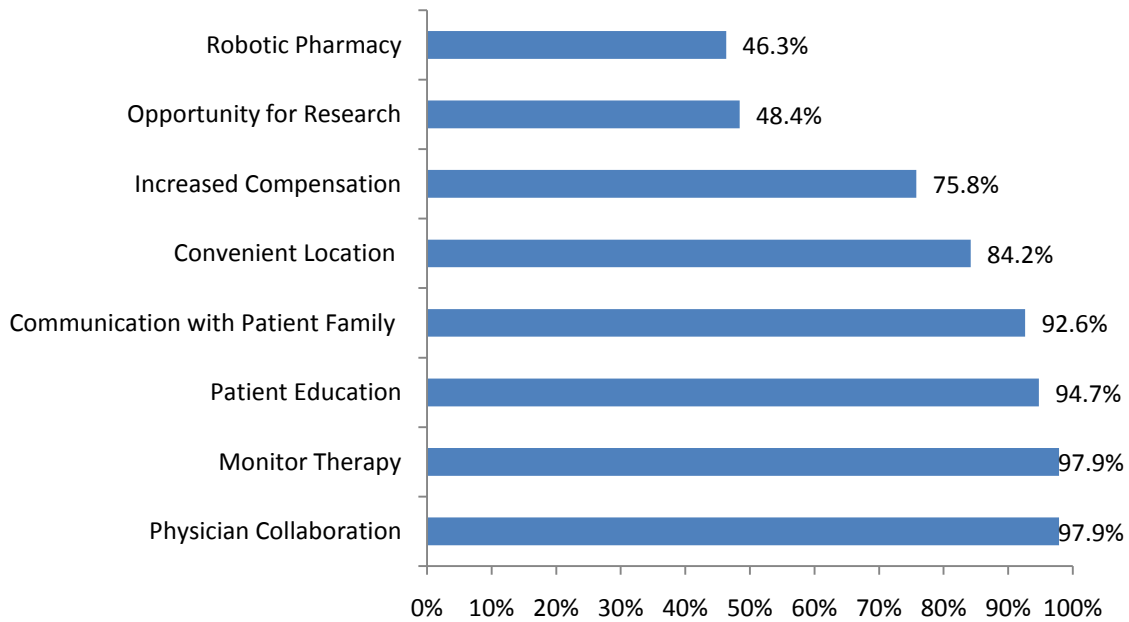
Figure 30. Percent of Active Pharmacists by Gender and Current Employment Setting, Arizona, 2008 (N = 1,819)



Source: Pharmacist Licensure Database, February 2009

Figure 29 shows that the majority of pharmacists work in a chain retail setting (57.8%), followed by hospital (23.9%) and mail order (5.4%). Male pharmacists tend to work in the retail chain setting more than female pharmacists. Female pharmacists (56.6%) are more likely to work in the hospital setting than male pharmacists (43.4%; Figure 30). The number of pharmacists increased in work settings such as retail chain, hospital, and mail order, while the independent pharmacists decreased (Appendix Table C5).

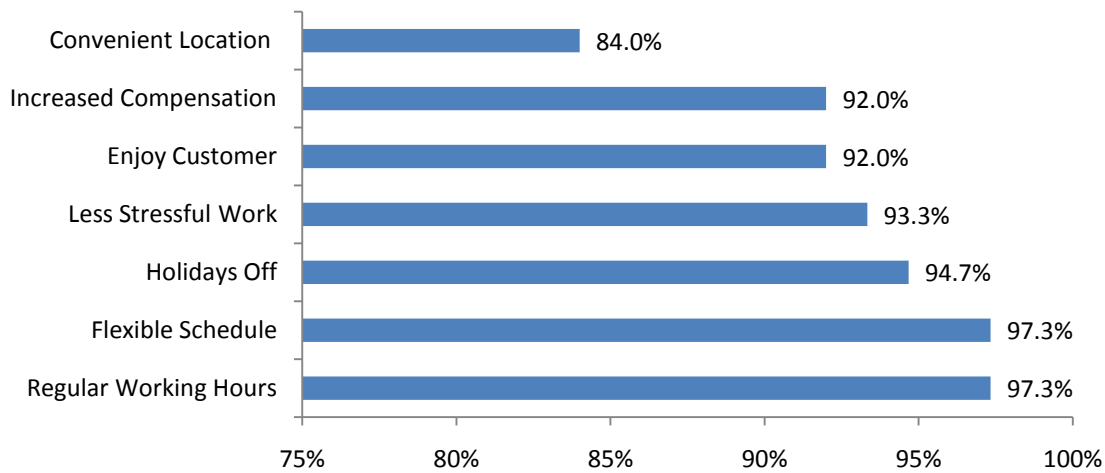
Figure 31. Percent of Active Pharmacists Living in Arizona to Switch from Retail to Hospital by Factors, 2008 (N = 95)



Source: Pharmacist Licensure Database, February 2009

Figure 31 shows the majority of active pharmacists who switched from retail to hospital employment consider communication with patient families (92.6%), patient education (94.7%), monitor therapy (97.9%), and physician collaboration (97.9%) as important factors for their career choice.

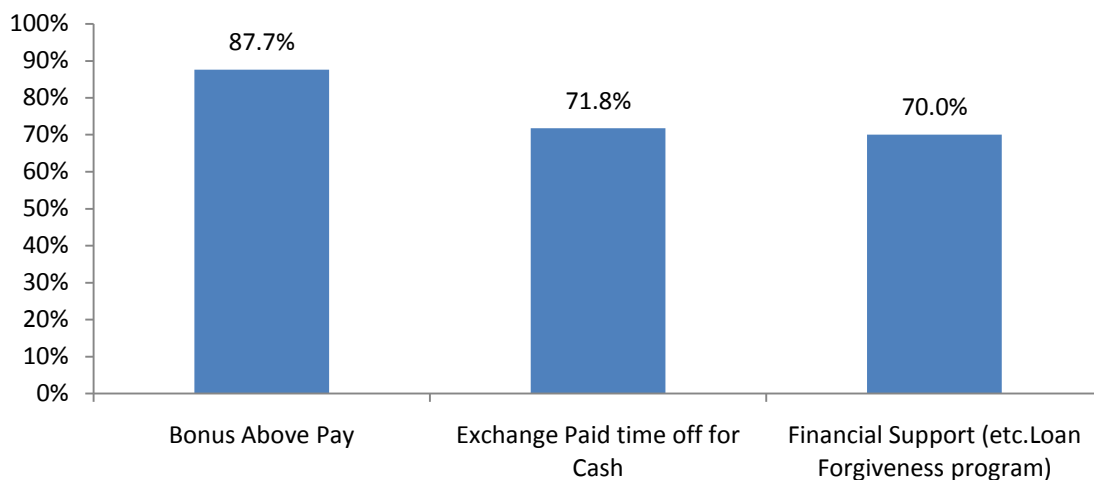
Figure 32. Percentage of Active Pharmacists Living in Arizona, Switch from Hospital to Retail by Factors, 2008 (N = 75)



Source: Pharmacist Licensure Database, February 2009

Figure 32 shows the majority of active pharmacists who switched from hospital to retail employment consider regular working hours (97.3%), flexible schedule (97.3%), holidays off (94.7%), and less stressful work (93.3%) as important factors for their career choice.

Figure 33. Percentage of Active Pharmacists Considering Important Options Provided by Primary Employer, Arizona, 2008 (N = 170)

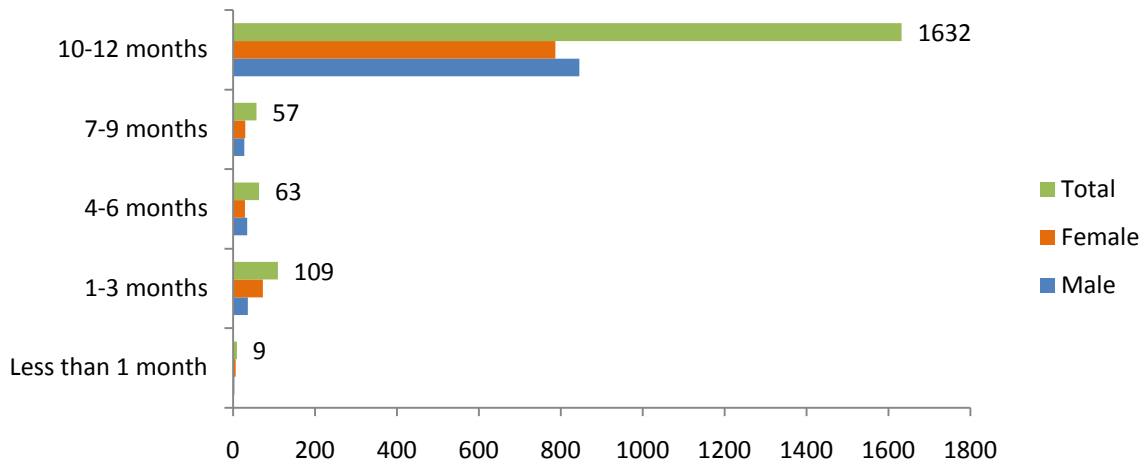


Source: Pharmacist Licensure Database, February 2009

Figure 33 shows active pharmacists rate bonus above pay, exchange paid time off for cash, and financial support as important options provided by the primary employer.

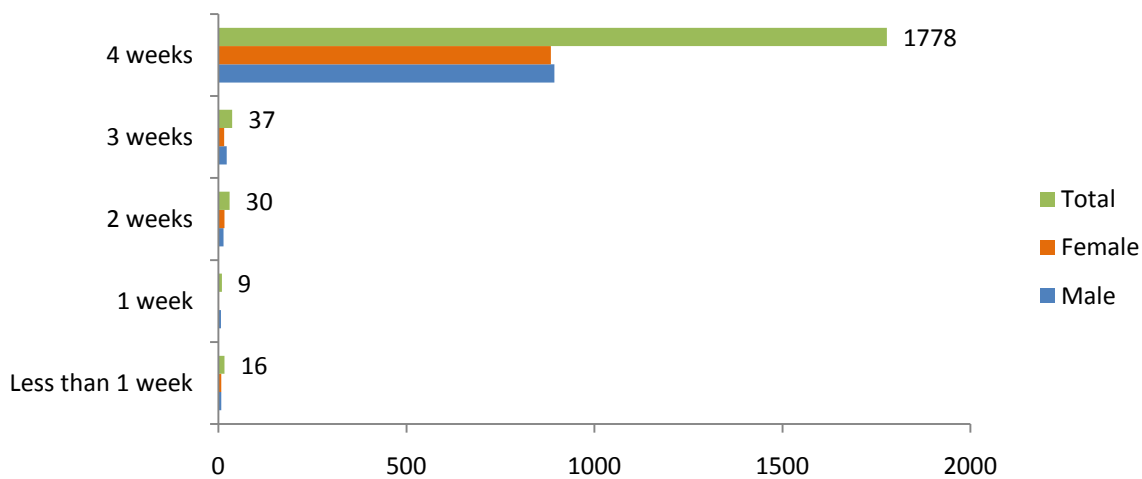
Converting Numbers of Pharmacists to Supply of Pharmacy Services

Figure 34. Number of Months Worked among Active Pharmacists per Year by Gender, Arizona, 2008 (N = 1,870)



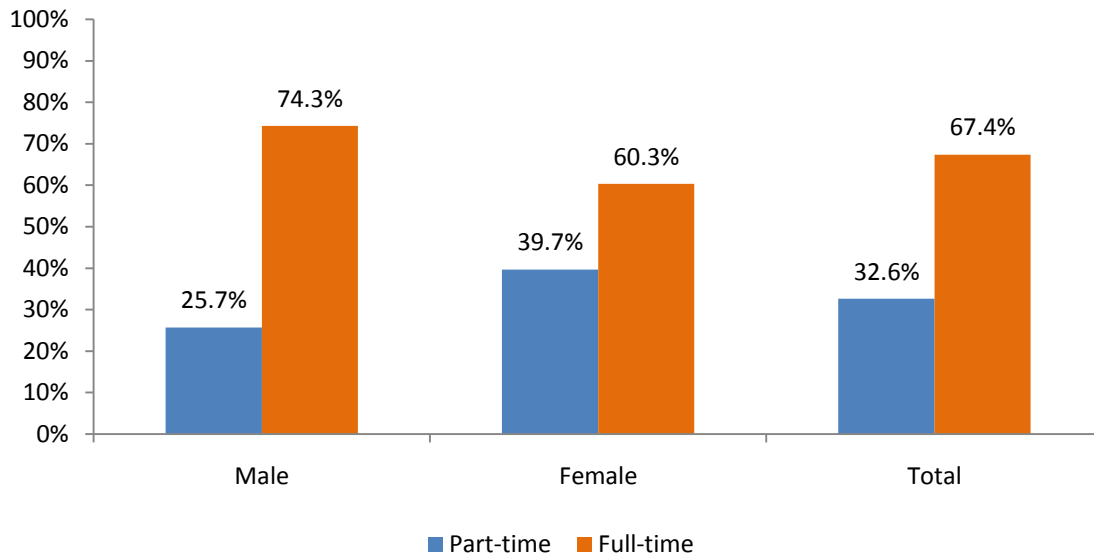
Source: Pharmacist Licensure Database, February 2009

Figure 35. Number of Weeks Worked among Active Pharmacists per Month by Gender, Arizona, 2008 (N = 1,870)



Source: Pharmacist Licensure Database, February 2009

Figure 36. Percentage of Full Time Equivalent Active Pharmacists by Gender, Arizona, 2008 (N = 1,870)

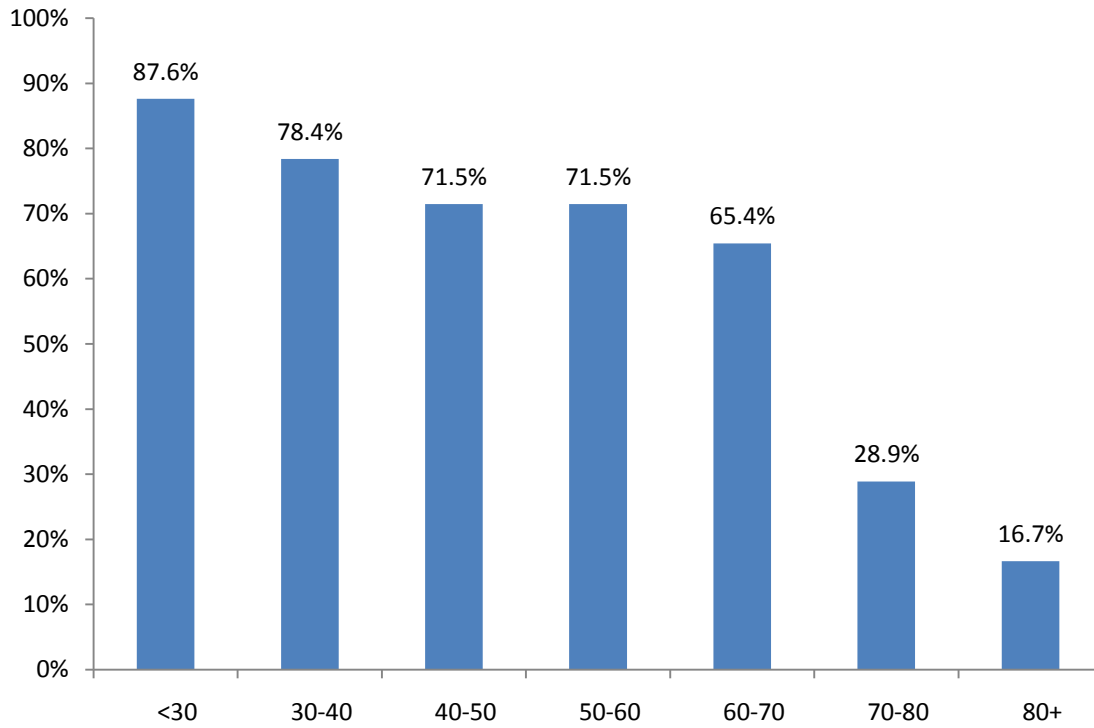


Source: Pharmacist Licensure Database, February 2009

Approximately 87% of active pharmacists worked 10 to 12 months and 95% of active pharmacists usually worked 4 weeks a month during the last 12 months (Figures 34 and 35). Approximately 77% of active pharmacists usually worked 40 hours or above per week during the last 12 months; female pharmacists are more likely to work at part-time basis. Male pharmacists are more likely to work overtime (Figure 36).

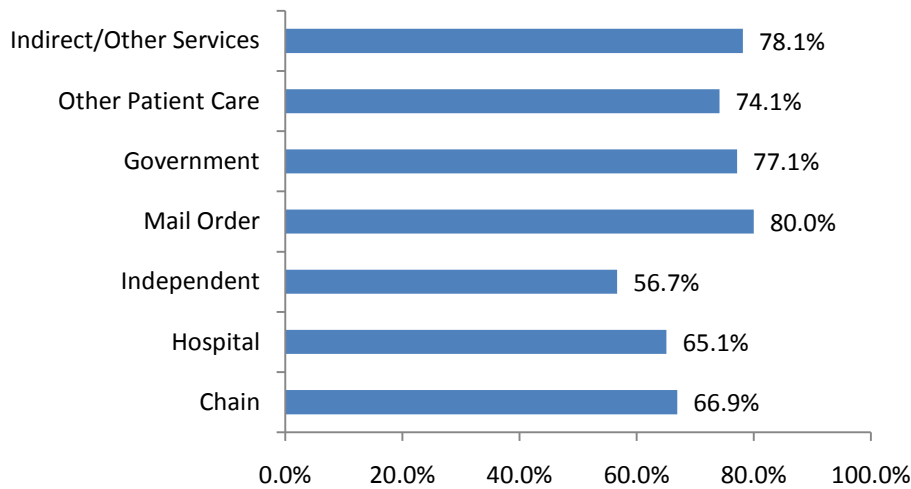
About 67% of active pharmacists worked full-time in Arizona. Male pharmacists (74.3%) are more likely work full-time than female pharmacists (60.3%). On average, male pharmacists work 162 more hours per year than female pharmacists (1,784 vs. 1,622 hours per year).

Figure 37. Percent of Full-time Active Pharmacists by Age Group, Arizona 2008 (N = 1,484)



Source: Pharmacist Licensure Database, February 2009

Figure 38. FTE Active Pharmacists by Employment Setting, Arizona, 2008 (N = 1,819)



Source: Pharmacist Licensure Database, February 2009

Figure 37 shows that younger pharmacists are more likely to work full time, although some pharmacists still work as full time employees in their older age (>70 years old).

Projections

The projection of current trends in the supply of pharmacists (Table 6) shows that the ratio of pharmacists to population in Arizona should continue to be higher than the national average. As we mentioned in a previous section, however, the use of national average ratios does not consider the manner in which differences in the characteristics of populations in different states affect the need for health care. The population of Arizona is both increasing more rapidly than the national average and also aging more rapidly than the national average. As Figure 30 shows, the ratio of pharmacists to the population age 65 and over in Arizona is predicted to decrease. The older population is the highest per capita users of medications, suggesting that demand for pharmacy services will increase more rapidly than the increase in the size of the population in Arizona.

Table 6. Projection of Active Pharmacists per 10,000 Residents, Arizona & US, 2000-2020

Year	AZ			U.S.		
	Pharmacist with Active License	Active Pharmacist per 100,000 Resident Population	Active Pharmacist per 100,000 Resident Population (Age >=65)	Active Pharmacist	Active Pharmacist per 100,000 Resident Population	Active Pharmacist per 100,000 Resident Population (Age >=65)
2000	3642	68.0	522.4			
2001	3825	69.0	530.3			
2002	4117	72.1	553.8			
2003	4385	74.6	573.3			
2004	4617	75.8	585.0	226,400	77.3	623.4
2005	4961	78.6	605.7	230,100	77.9	626.2
2006	5306	81.5	597.8	233,100	78.2	626.2
2007	5540	82.5	598.7	237,000	78.8	625.9
2008	5486	79.3	567.7	241,500	79.5	624.2
2009	5943	83.6	590.8	246,200	80.4	623.7
2010	6201	84.9	592.5	251,100	81.3	624.2
2011	6459	86.1	592.0	256,000	82.2	622.5
2012	6717	87.3	586.4	261,100	83.1	613.5
2013	6975	88.4	581.1	266,200	84.0	605.1
2014	7232	89.6	576.4	271,400	84.9	598.2
2015	7490	90.7	571.3	276,700	85.8	590.8
2016	7748	91.7	566.9	282,100	86.8	584.5
2017	8006	92.8	561.9	287,700	87.8	577.9
2018	8264	93.8	556.7	293,300	88.8	571.0
2019	8522	94.8	550.8	299,200	89.8	564.3
2020	8780	95.8	544.9	305,000	90.8	556.5

Source: U.S. pharmacists data was derived from the report "The Adequacy of Pharmacist Supply: 2004-2030" (HRSA 2008)

Arizona pharmacist data 2000-2007 was derived from ASBP annual reports, 2008 from ASBP Pharmacist Licensure Database Obtained in February 2009, 2009-2020 data is projected based on 2000-2008 numbers using Least-square method

*Note: 95.8% of pharmacists with active licenses living in Arizona actually work as active pharmacists.

Figure 39. Active Pharmacists per 100,000 Residents, Arizona & US, 2008-2020

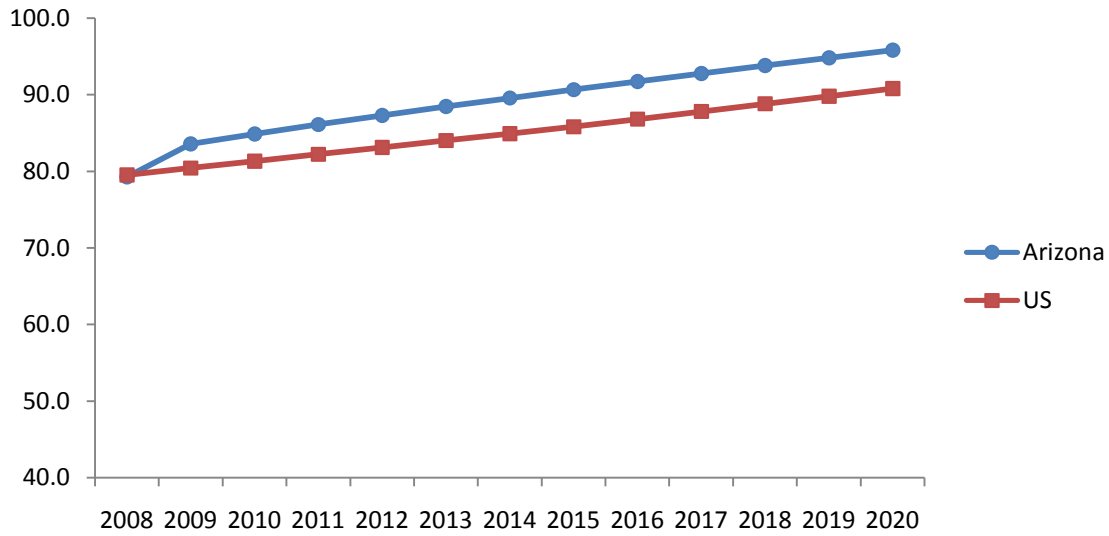
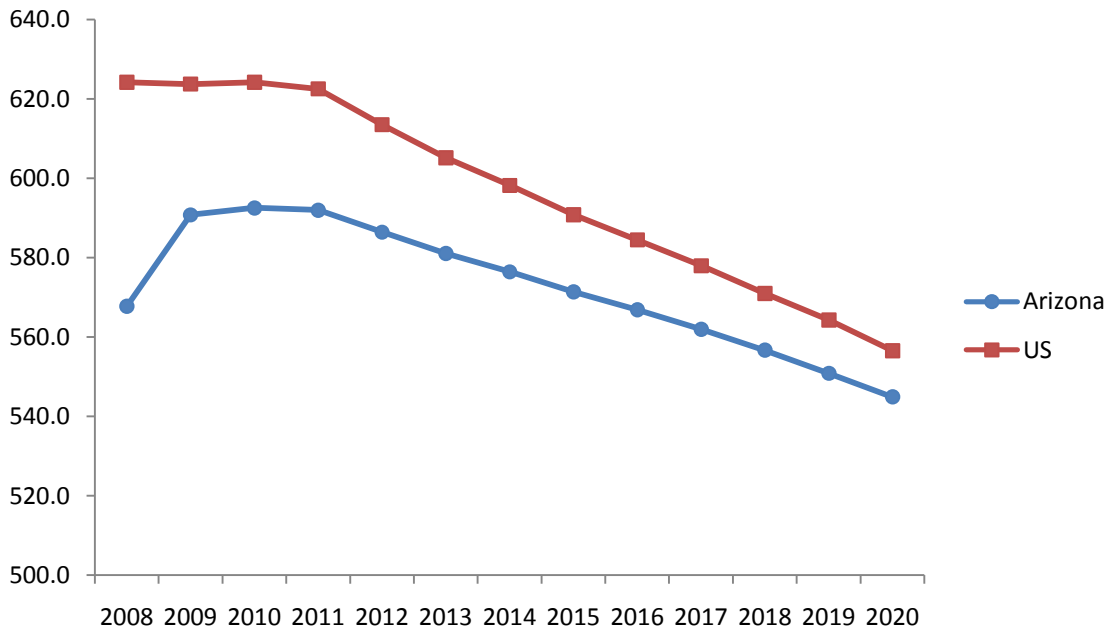


Figure 40. Active Pharmacists per 100,000 Residents Age 65+, Arizona & US, 2008-2020



Source: U.S. pharmacist data was derived from the report “The Adequacy of Pharmacist Supply: 2004-2030 (HRSA 2008)
 Arizona pharmacist data 2000-2007 was derived from ASBP annual reports, 2008 from ASBP Pharmacist Licensure Database
 Obtained in February 2009, 2009-2020 data is projected based on 2000-2008 numbers using Least-square method
 *Note: 95.8% of pharmacists with active licenses residing in Arizona actually work as active pharmacists.

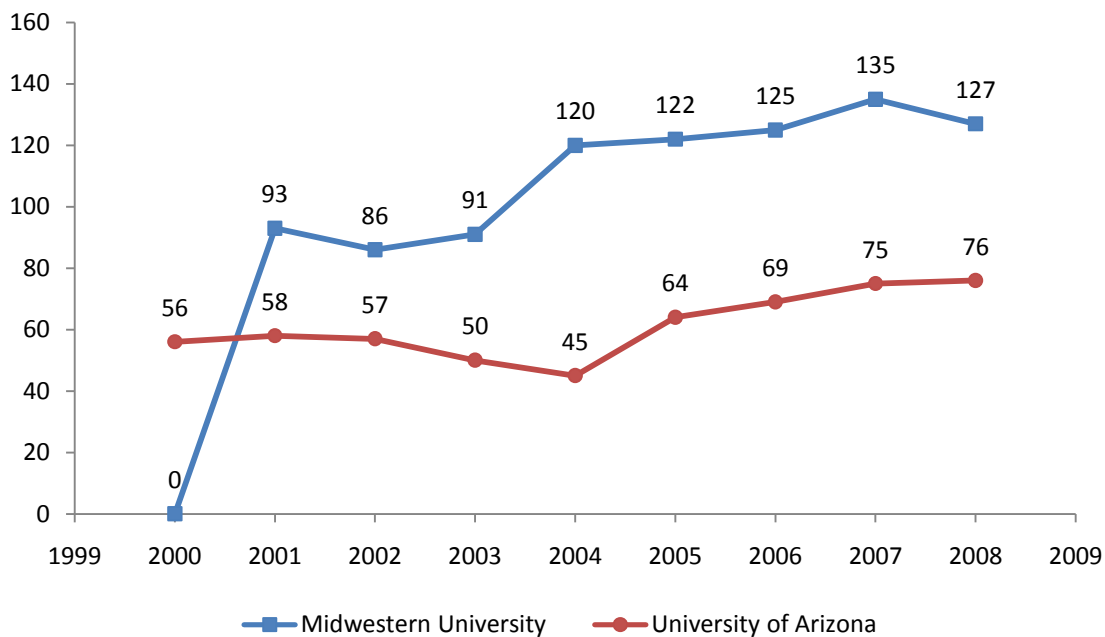
Figure 39 shows the projected increase of active pharmacists per 100,000 residents in both Arizona and U.S. from 2008 to 2020. However, the projection for the active pharmacists per 100,000 elder population aged 65 and above shows decreasing trends in both Arizona and United States (Figure 40).

Determinants of Supply

NEW GRADUATES AND TRAINING CAPACITY

Two pharmacy schools in Arizona provide education for new graduates with pharmacist degree. The number of new pharmacist graduates increased between 2000 and 2005 and then stabilized after 2005 (Figure 41). Current data from ASBP reveal that 3% of the state’s pharmacists with active licenses living in Arizona were foreign trained.

Figure 41. Number of New Graduates by College of Pharmacy in Arizona, 2000-2008

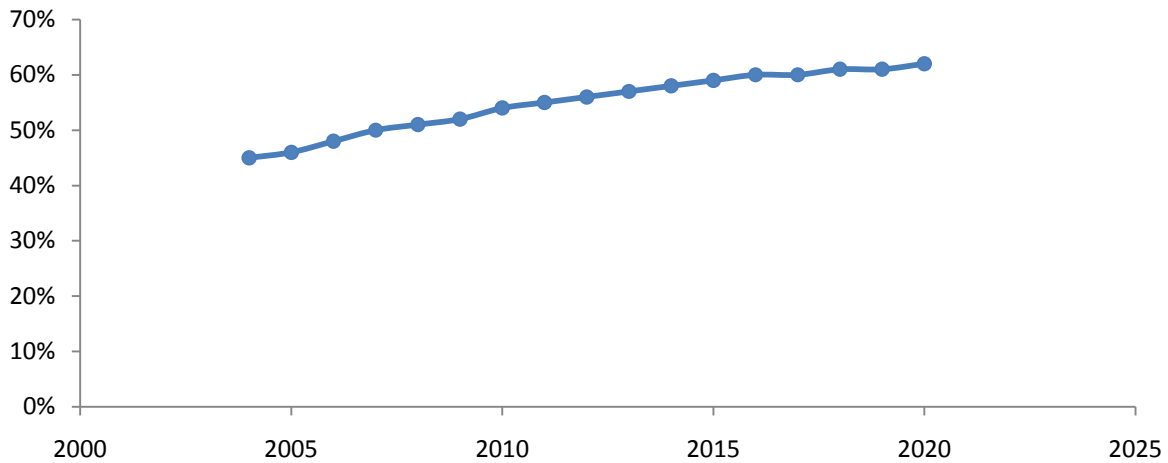


Source: Midwestern University and University of Arizona School of Pharmacy.

INCREASING NUMBER OF WOMEN IN PHARMACY

Approximately one-half of the pharmacists in the United States are women. The percentage of Arizona pharmacists who are women is quite close to the national average. If Arizona parallels national trends, the percentage of pharmacists in Arizona who are women will increase to 62%. (Figure 42).

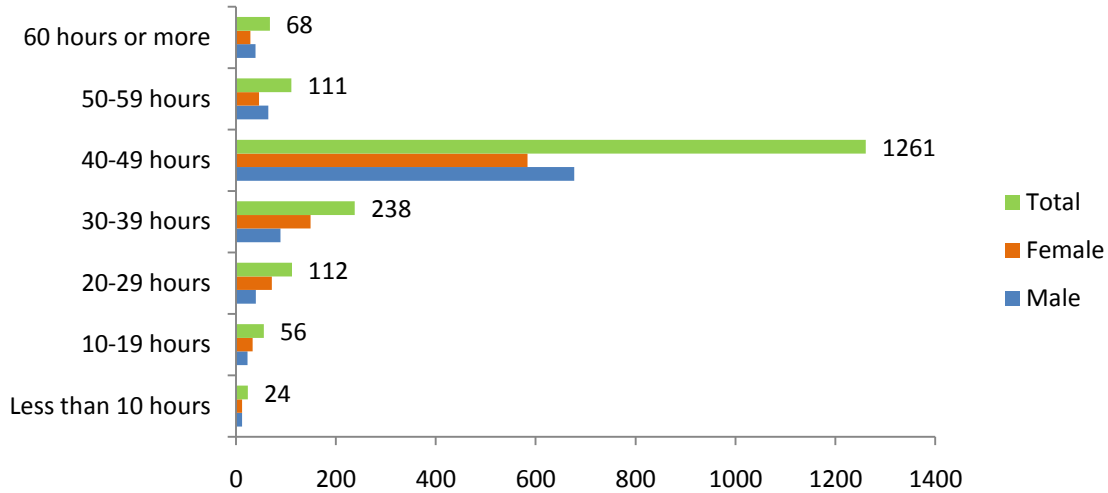
Figure 42. Percentage of Female Pharmacists, US, 2004-2020



Source: U.S. pharmacists data was derived from the report "The Adequacy of Pharmacist Supply: 2004-2030" (HRSA 2008)

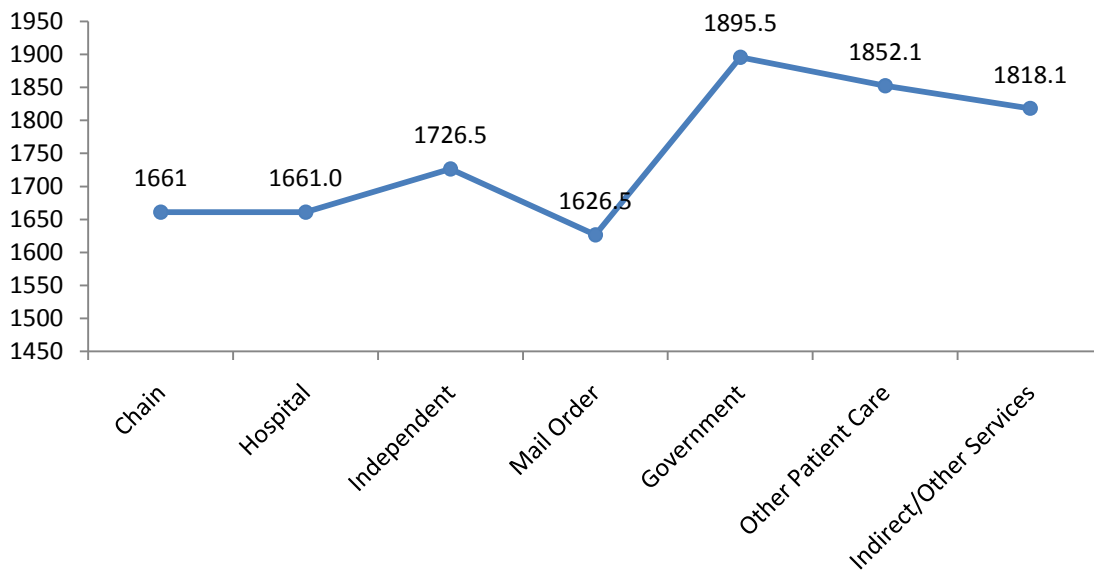
PHARMACIST HOURS WORKED

Figure 43. Number of Working Hours among Active Pharmacists by Gender, Arizona, 2008 (N = 1,870)



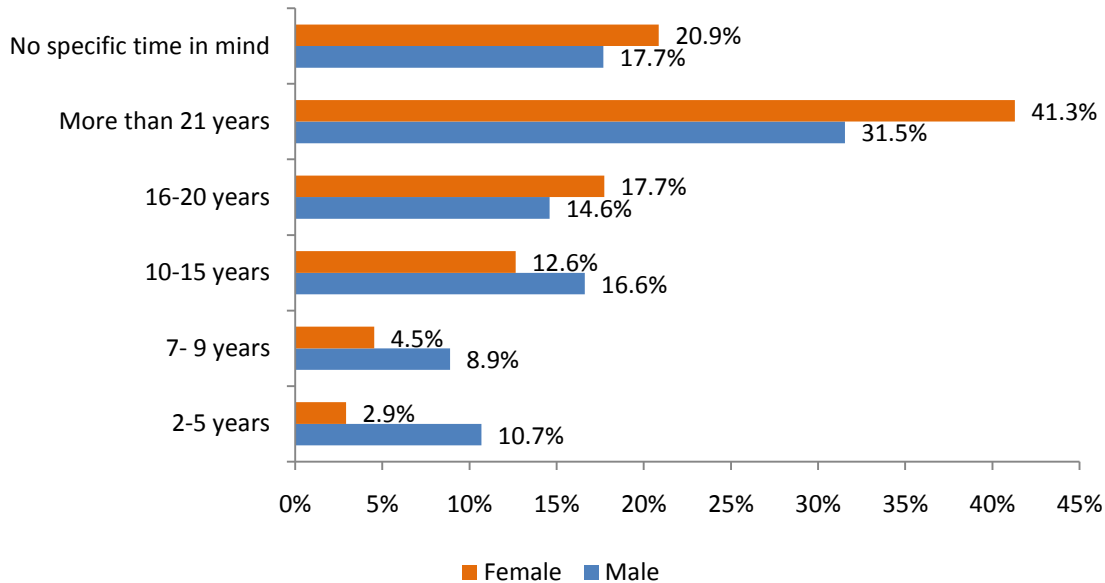
Source: 2008 Pharmacist Survey

Figure 44. Average Number of Working Hours among Active Pharmacists by Employment Setting, Arizona, 2008 (N = 1,870)



Source: 2008 Pharmacist Survey.

Figure 45. Percent of Active Pharmacists by Time to Retire and Gender, Arizona, 2008 (N = 1,870)



Source: 2008 Pharmacist Survey.

Figure 45 shows that about 20% of male pharmacists plan to retire in next decade. It means FTEs for pharmacy services will decrease faster than usual due to the higher proportion of FTEs among male pharmacists.

Renewals and First Time Licenses

Of 5,486 pharmacists with active licenses living in Arizona, 2,511 pharmacists renewed existing licenses and 377 were first time licensees in 2008.

Analysis shows that the supply of pharmacists could not meet the current and future pharmacy services demands in Arizona. Given that the supply of pharmacists is relatively fixed, the pharmacy technicians have been assigned with more responsibility, which may offset the demand of pharmacy services from pharmacists. For example, in the retail settings, often pharmacists are busy with drug dispensing and administrative tasks. Thus, pharmacy workforce study includes the supply of pharmacist technicians in Arizona in the following section.

Section IIIC: Pharmacy Technicians

Introduction

Pharmacy technicians help pharmacists with providing medication and perform routine tasks such as preparing prescribed medication and administrative duties. With the new trend to allow pharmacy technicians to assist pharmacists with more drug dispensing and technical duties, pharmacists could spend more time to provide disease management and patient counseling (Academy of Managed Care Pharmacy 2003).

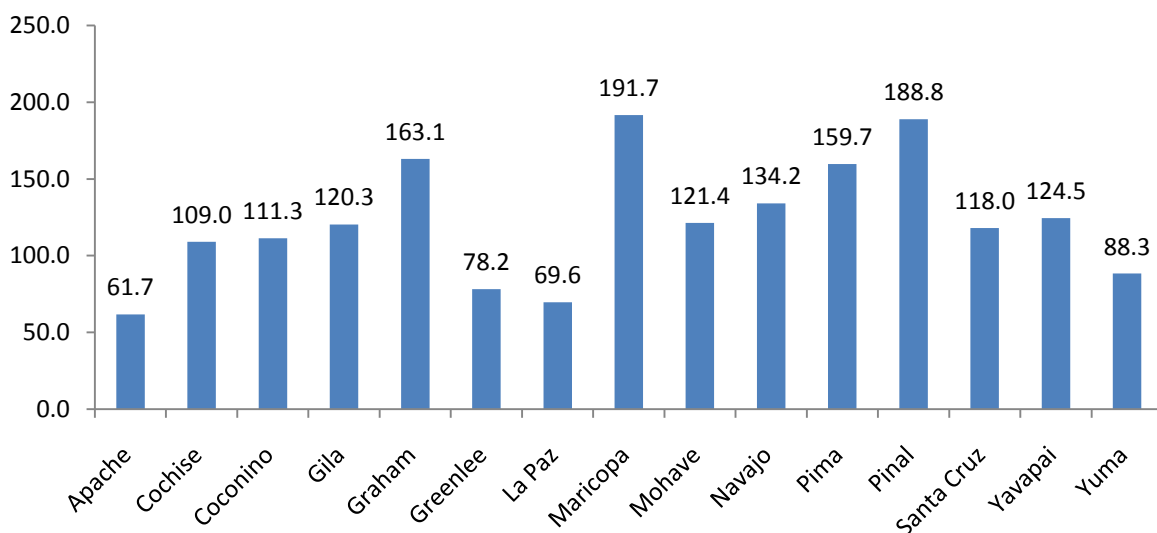
The ASBP requires all pharmacy technicians must be at least 18 years old, and provide a birth certificate and high school diploma. The ASBP started issuing pharmacy technicians with licenses in 2004 and has reported the number of pharmacy technicians in annual reports since 2005. The number of pharmacy technicians with active licenses in Arizona ranged from 10,637, to 13,236 by the end of June of 2006 through 2008, respectively. The number of pharmacy technicians may vary across months by several hundred throughout the year due to the constant in-and-out dynamics of the technician population. There are two types of technicians with active licenses: "Pharmacy Technicians" and "Pharmacy Technician Trainees." The full-fledged technicians have taken and passed the Pharmacy Technician Certification Board or PTCB exam, and provided ASBP with a copy of their certificate, or proof they have passed the exam. As of the December 2008, the number of pharmacy technicians with active licenses decreased to 11,372, with 7,114 pharmacy technicians having PTCB certification and 4,258 pharmacy technician trainees.

The 2008 Licensees as a Sample of All Active Pharmacy Technicians in Arizona

Out of 2,695 survey participants who have active license, 2,255 (83.7%) actively work as pharmacy technicians, 217 cases employed but not as a pharmacy technician and 207 cases are unemployed or retired. These unemployed or retired cases are excluded from the survey by the preset logic in the online questionnaire. After the employment question, there are 842 cases who self-reported as employed as pharmacy technicians. However, these 842 cases did not answer any of the following questions in the survey and there is not enough information to make assumptions regarding their answers for the following survey questions. Thus, those 842 cases will be treated as survey non-respondents vs. 1,413 survey respondents and the survey response rate is 62.7% (1,413/2,255) among active pharmacy technicians. All the linked survey

participants were pharmacy technicians with PTCB certification who renewed license from October through November in 2008. A total of 3,740 pharmacy technicians with PTCB certification who renewed license during October through November in 2008, the survey response would be 37.8% if this number is used. Appendix Table C8 shows the age distribution, and employment type of all pharmacy technicians with active license, pharmacy technicians with PTCB certification and active licenses as well as the survey participants. It shows that there is no significant difference between the pharmacy technicians with PTCB certification and active licenses in Arizona and the survey respondents of 2008 Arizona pharmacy technician survey. This means the survey respondents are representative of pharmacy technicians with PTCB certification and active licenses who live in Arizona.

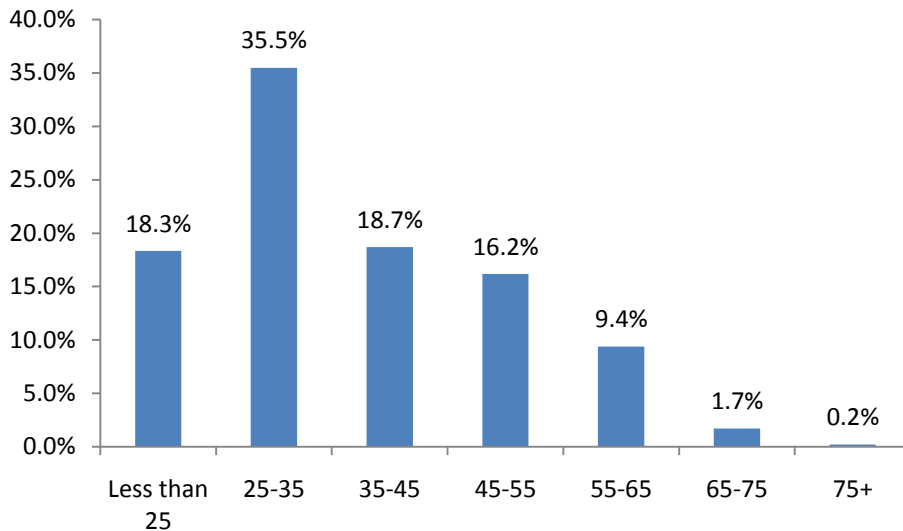
Figure 46. Pharmacy Technicians with Active Licenses Who Live in Arizona per 10,000 Residents, by County, 2008 (N = 11,372)



Source: Pharmacy Technician Licensure Database, February 2009

Figure 46 shows the ratio of pharmacy technicians with active licenses living in Arizona per 100,000 residents by county. Maricopa County has the highest ratio of pharmacy technicians per 100,000 residents (191.7), following by Pinal County (188.8), Graham County (163.1), and Pima County (159.7). About 67% of active pharmacy technicians reside in Maricopa County. There are pharmacy technicians in all 15 counties of Arizona and this may compensate the inadequacy of pharmacy services due to lack of pharmacists for the counties in rural area.

Figure 47. Percentage of Pharmacy Technicians with PTCB Certification and Active Licenses Living in Arizona by Age Group, 2008 (N =4,394)



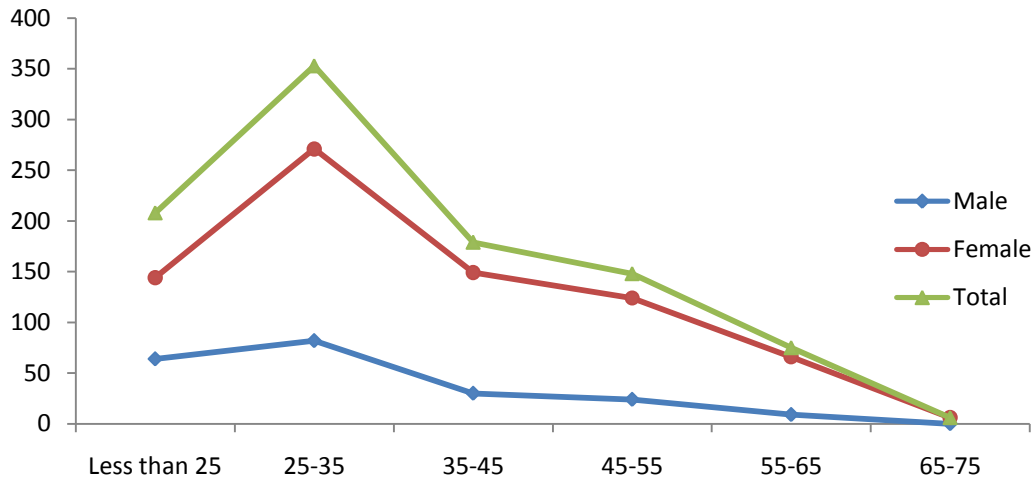
Source: Pharmacy Technician Licensure Database, February 2009

The age distribution of pharmacy technicians with PTCB certification and active licenses who live in Arizona in 2008 is displayed in Figure 47. It shows that the majority (88.7%) of pharmacy technicians with PTCB certification and active licenses are less than 55 years old.

Pharmacy Technicians Employed by an Arizona Employer

All of 1,413 pharmacy technician survey participants have PTCB certification and active licenses during 2008. The characteristics of active pharmacy technicians with PTCB certification residing in Arizona are derived from pharmacy technician survey 2008 as follows:

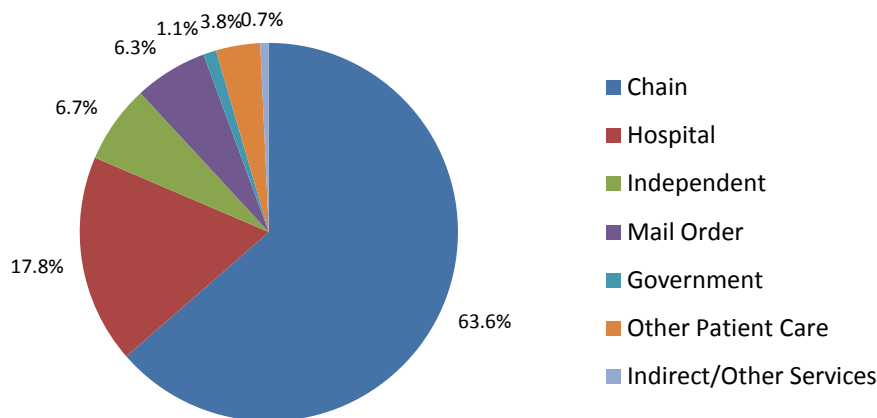
Figure 48. Number of Active Pharmacy Technicians by Age Group and Gender, Arizona, 2008 (N=969)



Source: 2008 Pharmacy Technician Survey

Overall, 77.4% of active pharmacy technicians are female. The age distribution of active pharmacy technicians by gender shows that more female and younger pharmacy technicians reside in Arizona (Figure 48). Male pharmacy technicians tend to be younger (mean age = 32.2) than female pharmacy technicians (mean age = 36.2).

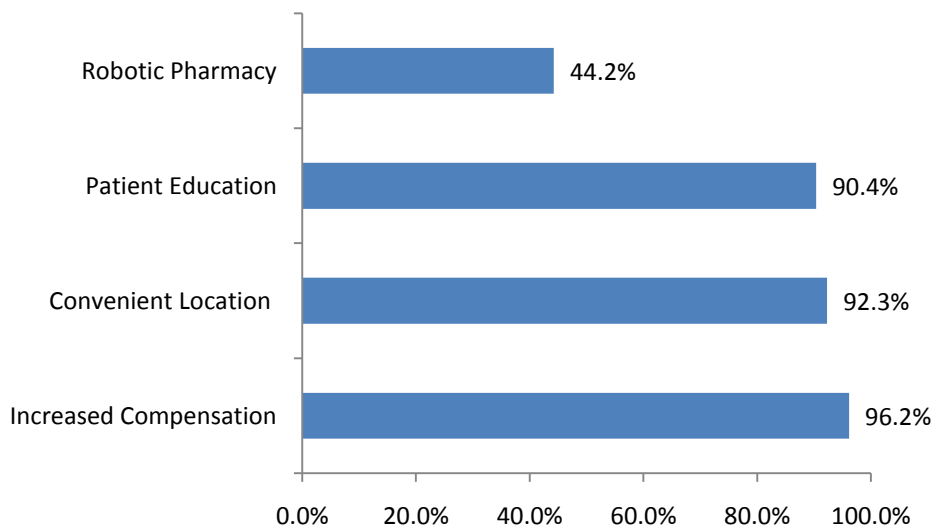
Figure 49. Distribution of Active Pharmacy Technicians by Current Employment Setting, Arizona, 2008 (N=1,373)



Source: 2008 Pharmacy Technician Survey

Figure 49 shows that the majority of pharmacy technicians work in the chain retail setting (63.6%), followed by hospital (17.8%), independent (6.7%), and mail order (6.3%).

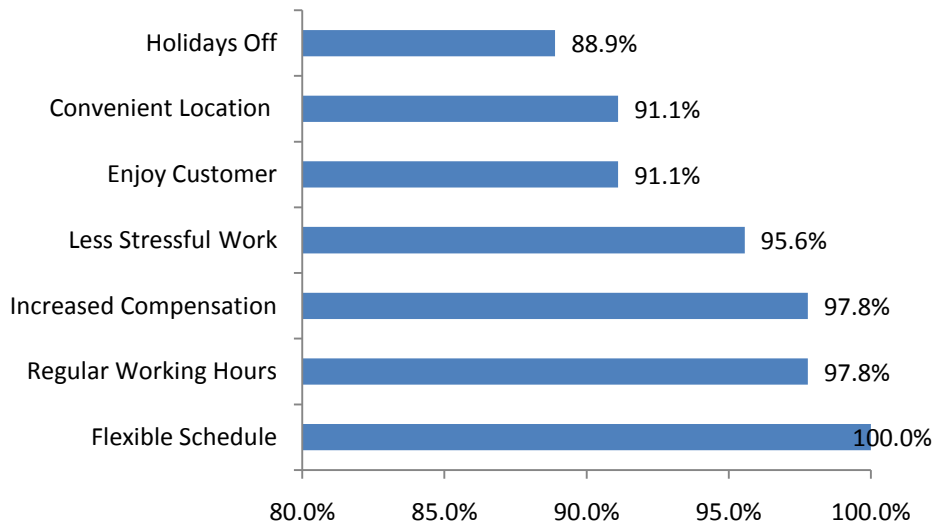
Figure 50. Percent of Active Pharmacy Technicians Living in Arizona to Switch from Retail to Hospital by Factors, 2008 (N=52)



Source: 2008 Pharmacy Technician Survey

Figure 50 shows the majority of active pharmacy technicians who switched employment from retail to hospital consider increased compensation (96.2%), convenient location (92.3%), and patient education (90.4%) as important factors for their career choice.

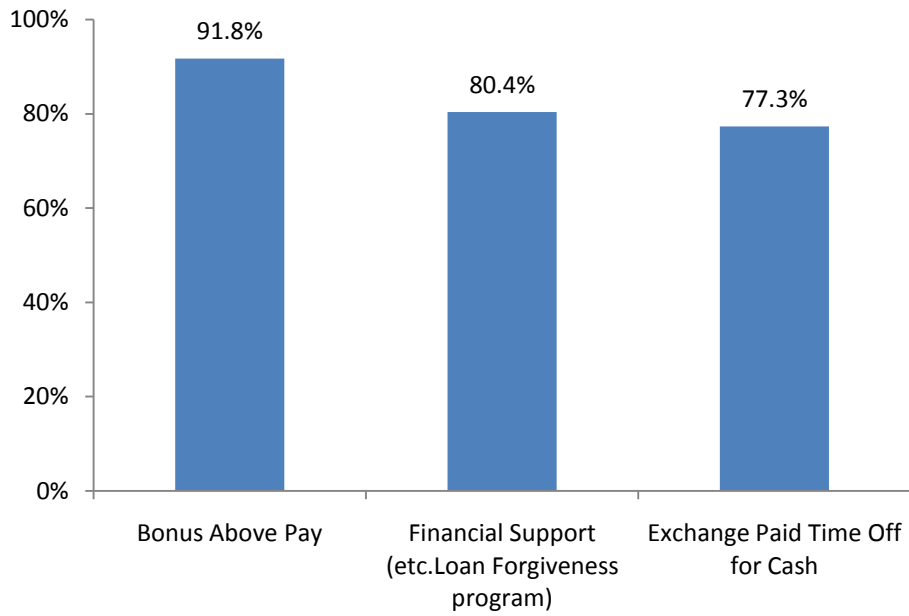
Figure 51. Percent of Active Pharmacy Technicians Living in Arizona to Switch from Hospital to Retail by Factors, 2008 (N=45)



Source: 2008 Pharmacy Technician Survey

Figure 51 shows the important factors impacting on pharmacy technicians' decision to switch employment from hospital to retail include flexible schedule (100.0%), regular working hours (97.8%), increased compensation (97.8%), and less stressful work (95.6%).

Figure 52. Percent of Active Pharmacy Technicians Who Live in Arizona Considering Important Options Provided by Primary Employer, 2008 (N=97)

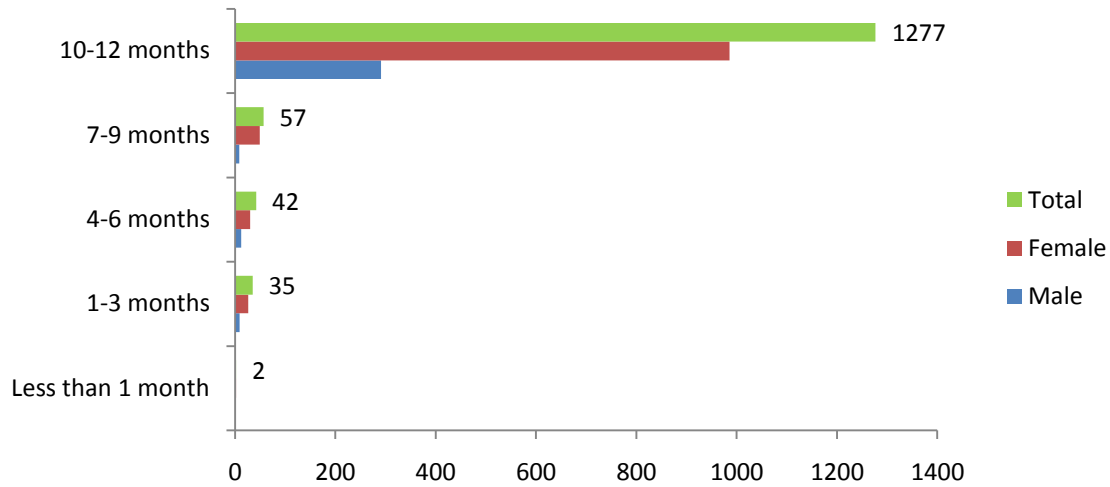


Source: 2008 Pharmacy Technician Survey

Figure 52 shows active pharmacy technicians consider bonus above pay, exchange paid time off for cash, and financial support as important options provided by the primary employer.

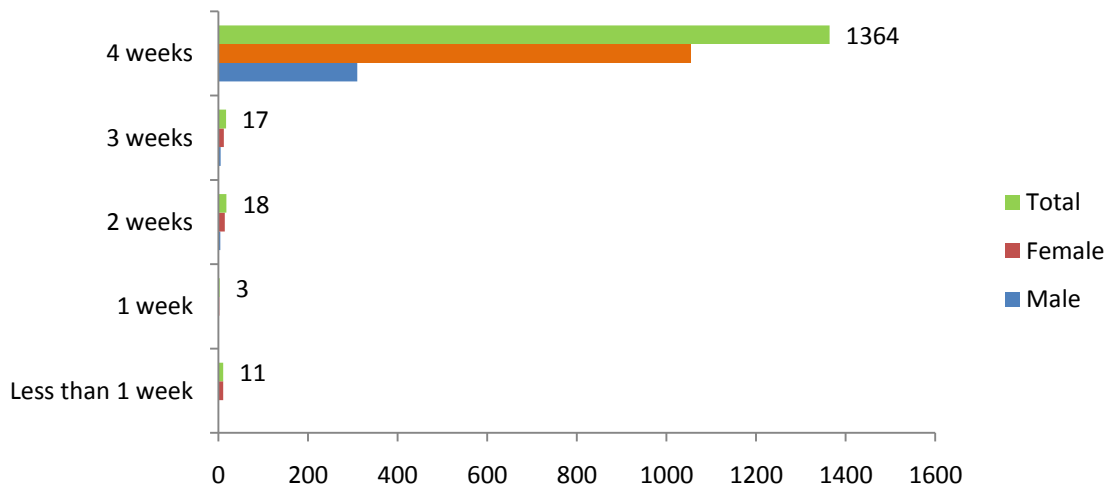
Converting Numbers of Pharmacy Technicians to Supply of Pharmacy Services

Figure 53. Number of Months Worked among Active Pharmacy Technicians per Year by Gender, Arizona, 2008 (N =1,413)



Source: 2008 Pharmacy Technician Survey

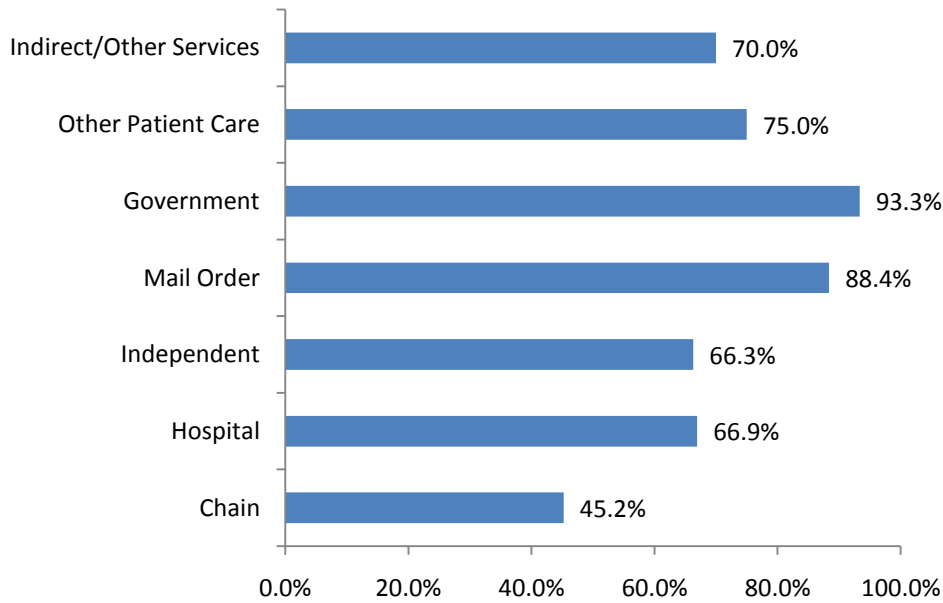
Figure 54. Number of Weeks Worked among Active Pharmacy Technicians per Month by Gender, Arizona, 2008 (N =1,413)



Source: 2008 Pharmacy Technician Survey

Approximately 90% of active pharmacy technicians worked 10-12 months and 96.5% of active pharmacy technicians usually worked 4 weeks a month during the last 12 months (Figures 43 and 44). About 55% active pharmacy technicians work full-time in Arizona. On average, pharmacy technicians work 1,647 hours per year.

Figure 55. FTE Active Pharmacy Technicians by Employment Setting, Arizona, 2008 (N=1,413)

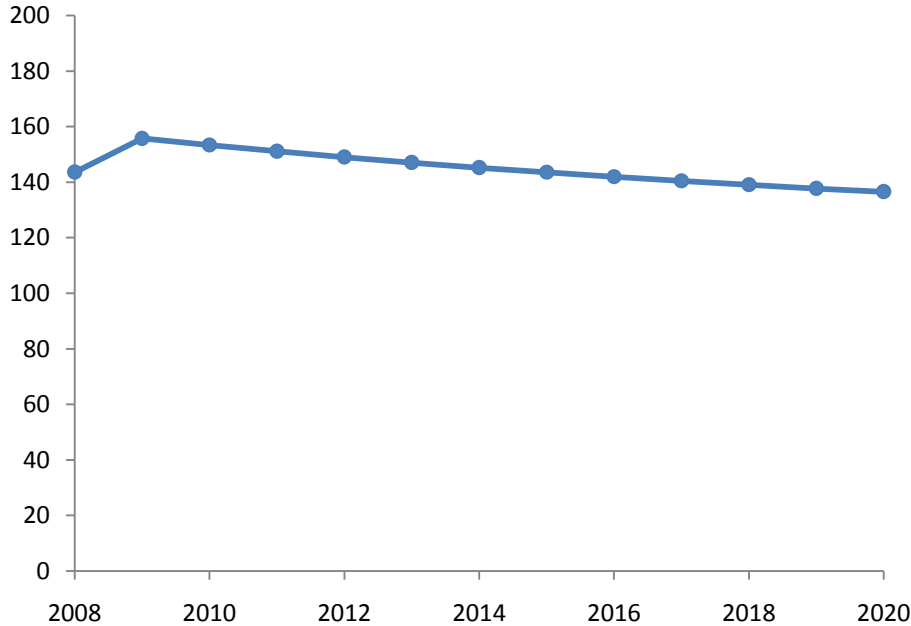


Source: 2008 Pharmacy Technician Survey

Figure 55 shows that active pharmacy technicians with the employment in government and mail order are more likely to work as full time employees.

Projections

Figure 56. Active Pharmacy Technicians per 100,000 Residents, Arizona, 2008-2020



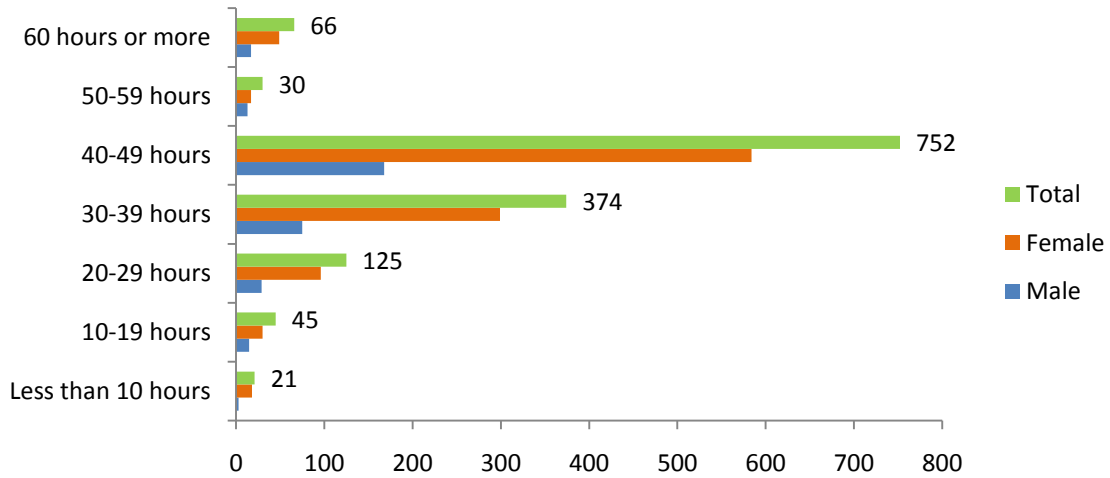
Data Source: Arizona pharmacy technician data 2005-2007 was derived from ASBP annual reports, 2008 from ASBP Pharmacy Technician Licensure Database Obtained in February 2009, 2009-2020 data is projected based on 2005-2008 numbers using Least-square method;

***Note:** 83.7% of pharmacy technicians with active license living in Arizona actually work as active pharmacy Technicians.

The overall number of pharmacy technicians with active licenses may decline in the future (Figure 56), while the number of pharmacy technicians with PTCB certification and active licenses will increase due to more emphasis of technician qualification and training.

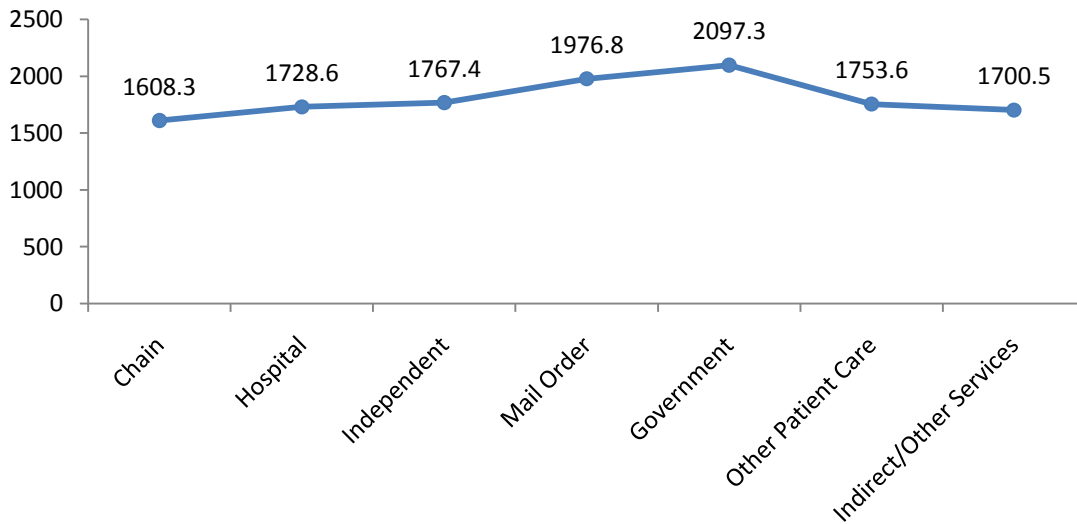
PHARMACY TECHNICIAN HOURS WORKED

Figure 57. Number of Working Hours among Active Pharmacy Technicians by Gender, Arizona, 2008 (N =1,413)



Source: 2008 Pharmacy Technician Survey

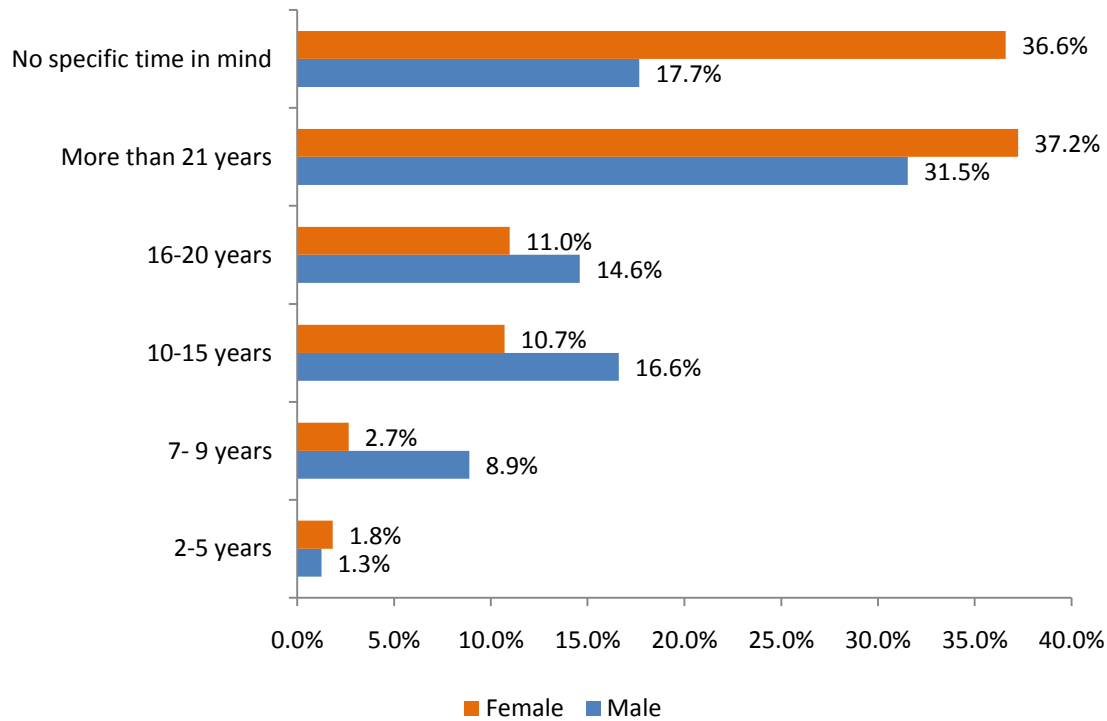
Figure 58. Average Number of Working Hours among Active Pharmacy Technicians by Employment Setting, Arizona, 2008 (N =1,413)



Source: 2008 Pharmacy Technician Survey

About 60% active pharmacy technicians worked 40 hours or more per week during the last 12 months (Figure 57). The pharmacy technicians who work in the employment settings of government and mail order are more likely to work longer hours (Figure 58).

Figure 59. Percentage of Active Pharmacy Technicians by Time to Retire and Gender, Arizona, 2008 (N =1,413)



Source: 2008 Pharmacy Technician Survey

Figure 59 shows that about 4.4% of pharmacy technicians plan to retire in next decade.

Renewals and First Time Licenses

Of 7,114 pharmacy technicians with active license and PTCB certification residing in Arizona, 3,953 pharmacy technicians obtained active licenses either through the license renewal process (3,382) or application for a new Arizona license (571).

Section IIID: Summary of Pharmacy Workforce Results

The 2008 Arizona Pharmacy Workforce Report is the first study to look at the trends of pharmacy workforce in Arizona. The pharmacy workforce licensure data is used to estimate current supply and project the future supply, and describe the basic characteristics of pharmacists and pharmacy technicians with active licenses living in Arizona. The 2008 pharmacist and pharmacy technician surveys provide more insights on the estimation of full-time equivalent employment and important factors impacting on the career choice of pharmacists and pharmacy technicians. The key findings are as follow:

Females constitute a growing proportion of active pharmacists and pharmacy technicians. Approximately 49.5% of active pharmacists and 77.4% of active pharmacy technicians are women. Female pharmacists tend to work fewer hours per year than their male counterparts. Thus, FTE supply will grow at a lower rate than the number of active pharmacist supply.

Although the total number of pharmacy technicians with active licenses is high, only about half of them have PTCB certification and an active license. This highlights the need of training for pharmacy technicians to equip them with knowledge and skills to meet the increasing demand of pharmacy services.

The current active pharmacy workforce considers bonus above pay, exchanging paid time off for cash, and financial support as important options provided by the primary employer. Most active pharmacists and pharmacy technicians switching employment from hospital to retail rate regular working hours, flexible schedule, and less stressful work as important factors for their career choice. On the other hand, communication with patient family, patient education, monitoring therapy, and physician collaboration are rated as important factors among active pharmacists who switched employment from retail to hospital, while increased compensation, convenient location, and patient education are important factors for pharmacy technicians switching from retail to hospital.

The ratio of pharmacists per 100,000 residents in Arizona has been increasing during the past eight years and is close to national level, which is still in the shortfall of pharmacists. The shortage of pharmacists is more severe for the counties in rural areas. Arizona's pharmacy workforce tends to be younger with less working experience compared with the nation. It is projected that the supply of Arizona pharmacists will increase at a faster rate than the overall

population, Arizona has much more rapid growth of elder population 65 years old or above, which significantly increases the demand for pharmacy services in the near future. The increases in supply may or may not, therefore, be sufficient to offset the increased demand for services. The final results will also depend upon a number of unpredictable factors such as changes in health insurance coverage and potential changes in the mix of diseases that will affect the elderly population.

Part IV. Physician Assistants

Background

Physician Assistants (PAs) are licensed to practice medicine under the supervision of physicians working in all areas of medicine including family practice, internal medicine, pediatrics, obstetrics and gynecology, and surgery subspecialties. The PA profession arose in the mid 1960's to aid in the shortage of physicians in the workforce and to expand the delivery of medical care (AAPA: Information about PAs and the PA Profession, 1998-2009). Many general medical practices can be performed by PAs, including physicals, diagnostics, therapeutic care, preventive care, assist in surgeries, and prescribe medication. Physician Assistants practice health care in rural areas where there is little access to physicians, inner city clinics where people have little money for health care, and in hospitals and private doctors' offices to allow physicians to see more patients in less time. (Physician Assistants, 1998)

Physician Assistant programs offered by accredited schools have more than doubled from 55 to 142 from 1992 to 2008 (Facts At A Glance, 2008). There were approximately 4,600 new PA graduates in 2007; at the beginning of year 2008 there were approximately 12,000 students enrolled in a PA program (Facts At A Glance, 2008). Most PA programs are two years in length and focus on a broad range of education in medicine. There are two accredited PA programs in the state of Arizona, namely the Arizona School of Health Sciences (accredited October 1996) and Midwestern University (accredited October 1999) (Accredited Entry-level Programs, 2009).

After a rapid expansion of PAs entering the health care workforce in the late 1990s, the number of PAs entering the profession has stabilized (Cawley, 2008). It is expected, however, that the number of PAs entering the workforce will be a total increase of 27% by the year 2016 (Occupational Outlook Handbook, 2008-2009 Edition, 2007). The predicted increase of PAs can be attributed to many factors, such as emphasis on cost containment as PAs are cost-effective, provide high quality of care, and assist in medical and surgical procedures relieving physicians of routine duties and procedures (Occupational Outlook Handbook, 2008-2009 Edition, 2007). Physician assistants also increase productivity in terms of number of patients seen and improve the workload of the employing doctor (Hooker, 2006).

There were 79,980 licensed PAs eligible to practice in the United States in 2008 (American Academy of Physician Assistant, 2008). Females accounted for approximately 60% of the total.

The mean age was 41 and the mean age at time of graduation from PA school was 30 (American Academy of Physician Assistant, 2008). Forty-three (43.1%) percent of PAs hold a bachelor's degree and approximately 35.7% hold a masters degree. Of those who responded to the survey 92.5% of the PAs work in a clinical practice and 25.9% specialize in Family/General Medicine (American Academy of Physician Assistant, 2008). Nearly 13% (12.5%) of PAs work two concurrent PA jobs (American Academy of Physician Assistant, 2008).

The same 2008 AAPA Census survey included 590 respondents who either worked in Arizona or gave the state as their preferred mailing address. Arizona respondents were very similar to the respondents from the nation as a whole. Sixty-one percent (61.8%) of the 590 respondents were female. Respondents in Arizona had a slightly lower percentage of PAs with a bachelor's degree (29.2%) than the nation as a whole, but a higher percent of individuals with a master's degree (57.6%). Nearly 20% of PAs have a certificate from a PA school and 5.2% have an Associate's degree from PA school.² Twenty-eight percent (28.8%) of Arizona respondents' specialty was General Internal Medicine.

Methods

Data in this report were derived from Physician Assistant Licensing data bases for the calendar year 2008. CHIR obtains these data through its partnership with the Arizona Medical Board which provides technical support to the Arizona State Regulatory Board of Physician Assistants. The results include PAs with an active Arizona license who provide care in Arizona.

The licensure data provides the baseline statistics used to measure the current Physician Assistant workforce in Arizona and to describe characteristics including gender distribution, license status and county of residence.

Arizona State Board of Physician Assistants requires PAs to renew their licenses annually between June and October regardless of when their license was initially issued.

Unlike other sections in this report, there is limited data that is available to report on in regards to Physician Assistants. In the future, administering a survey to PAs during license application and renewal, similar to the model CHIR uses to collect valuable information on the physician workforce would assist in building a more comprehensive dataset for study.

² Totals add up to more than 100% as some PAs received multiple degrees.

Results

In 2008 there were 1,796 PAs with an active license in the state of Arizona (Arizona Medical Board (AMB), 2009). Of those with an active Arizona license, 86.3% (1,521) practice in the state.

Physician Assistants are more likely than physicians to provide primary health care to rural areas, where people have little access to doctors (Physician Assistants, 1998) (Hooker, 2006). A study looking at who is providing health care to the neediest population in California and Washington showed that Physician Assistants are more likely than others in primary care to serve the underserved (Physician Assistants, Nurses, and Family Physicians Care For Underserved, 2003). The study found that 22% of PAs in California and 28% of PAs in Washington practiced in rural areas in 1998 (Physician Assistants, Nurses, and Family Physicians Care For Underserved, 2003). In 2008, approximately 18% of licensed PAs who practice in the state of Arizona practice in a rural area.³ Table 7 shows percentages and rates (per 10,000 residents) of active PAs practicing in an Arizona county.

³ Rural area for Arizona in this report was defined by all counties excluding Maricopa and Pima.

Table 7. Active Arizona PAs, by County, 2008 (N = 1,521)

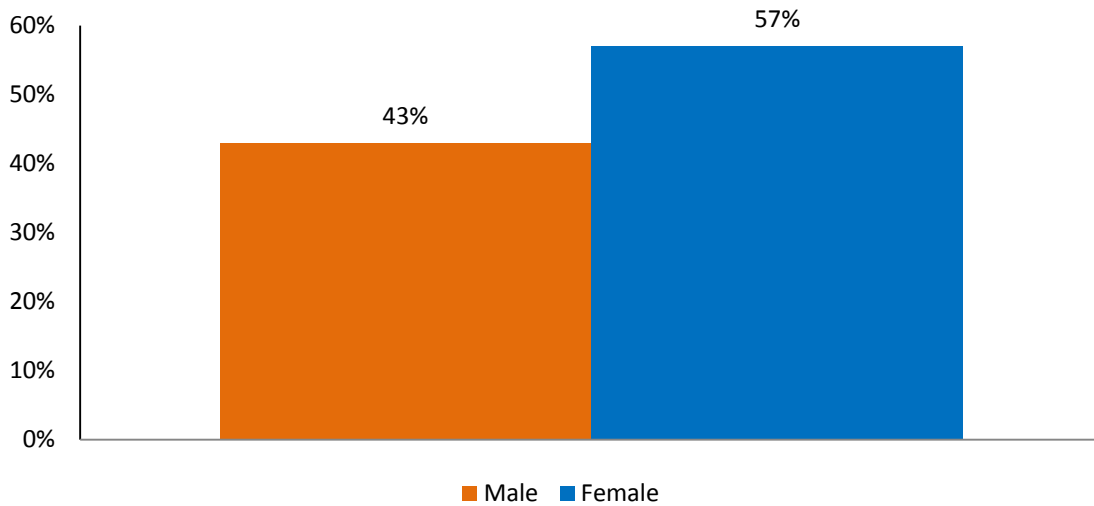
<i>County</i>	<i>Number</i>	<i>Percent</i>	<i>Population</i>	<i>Per 10,000 Residents</i>
Apache	7	1.4%	69,980	1.0
Cochise	4	0.8%	127,866	0.3
Coconino	14	2.7%	127,450	1.1
Gila	1	0.2%	51,994	0.2
Graham	3	0.6%	34,769	0.9
La Paz	1	0.2%	20,172	0.5
Maricopa	394	75.8%	3,880,181	1.1
Mohave	18	3.5%	194,944	0.9
Navajo	3	0.6%	111,273	0.3
Pima	31	6.0%	976,089	0.3
Pinal	19	3.7%	299,246	0.6
Santa Cruz	1	0.2%	42,845	0.2
Yavapai	9	1.7%	212,635	0.5
Yuma	15	2.9%	190,557	0.8
Totals	520	99.5%	6,293,201	

Source: AMB, 2009, Population Division, U.S. Census Bureau, 2008

Note: 1,001 were missing indication of county.

Figure 60 shows the distribution of gender of PAs with an active Arizona license and who practice in the state of Arizona. The state of Arizona's PA gender distribution closely mirrors that of the national distribution of PAs, which has a higher percentage of licensed female PAs (60%). The "feminization" of the PA workforce is part of a trend that is seen in other traditionally male-dominated professions such as medicine and law (Larson & Hart, Fall 2007).

Figure 60. Comparison of Gender with an Active Arizona License, Physician Assistants, CY08 (N = 1,521)

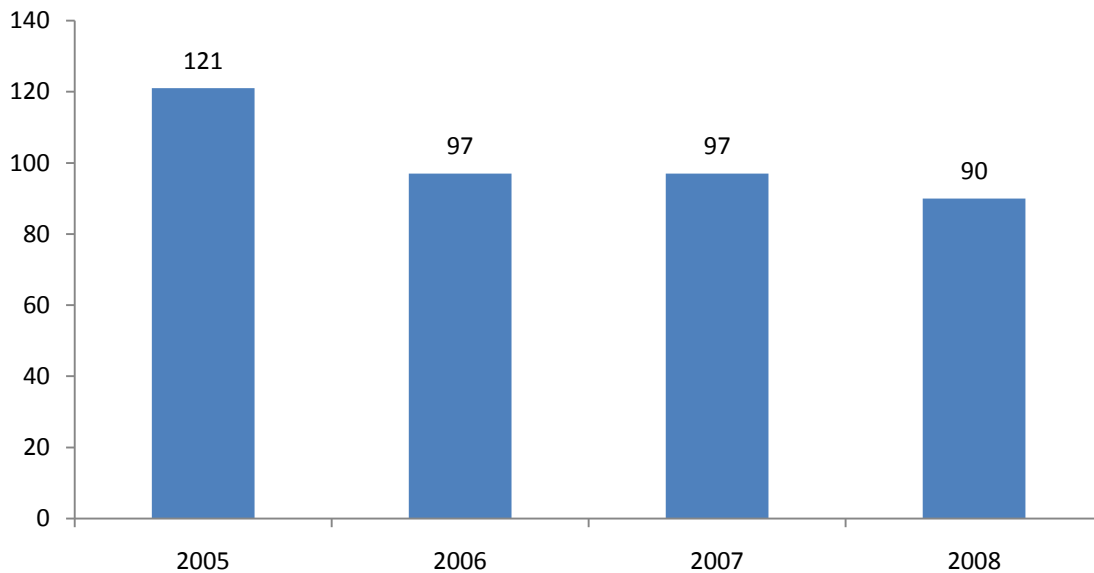


Source: AMB, 2009

Note: 113 cases were missing indication of gender.

Figure 61 shows the number of individuals who graduated from a PA program, by year, for those with an active Arizona license and that practice in Arizona.

Figure 61 Active & Practicing Arizona PAs by Year of Graduation, 2005 to 2008 (N = 1,521)

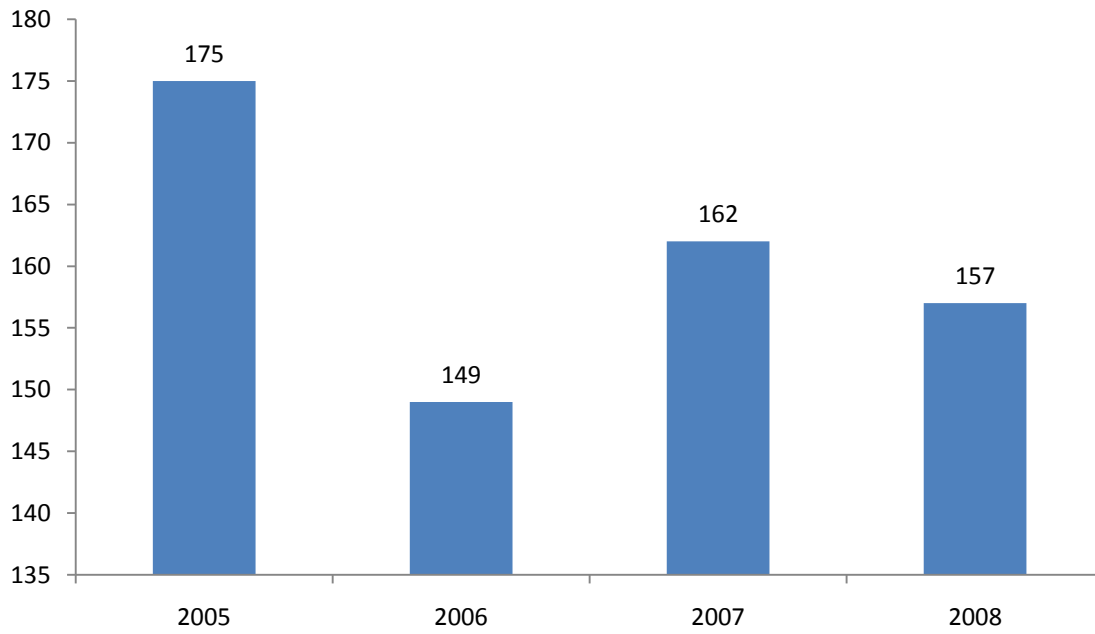


Source: AMB, 2009

Note: 38 records were missing indication of graduation date.

Figure 62 show the number of PA license issued, by year, for those with an active PA license and practice in the state of Arizona.

Figure 62. Active and Practicing Physician Assistants by Year of License, Arizona, 2005 to 2008 (N = 1,521)



Source: AMB, 2009

Note: 1 record was missing indication of Initial License date.

In both Figure 61 and Figure 62, there were more individuals graduating from a PA program and receiving their initial PA license in 2005 than in any of the following years.

Summary

With the increase in Physician Assistants in the health care workforce, there is more need for research detailing potential activities, quality of care, and cost of PAs (Morgan, Strand, & Ostbye, 2005). The current national survey used to assess PAs in the workforce lack detailed information regarding care provided by the PA/Physician team, the scope of practice from one team to another, and questions targeted specifically for PAs.

Since PAs work under the supervision of a physician and are not independent providers, there is a need to collect additional information that focus on the care provided by the team. Each PA practice can be different in kind. Each PAs scope of practice is defined between the PA and the supervising physician, adding difficulty in survey design as the scope of practice is not universal and may vary from PA to PA. The individual scope of practice also limits the generalization of local studies. National Surveys have frequently underrepresented PAs and typically target questions for physicians. (Morgan, Strand, & Ostbye, 2005)

Due to the lack of detailed data that is collected there no evidence of PAs' satisfaction with their profession, the supervising physicians' behaviors and its influence on PA responsibilities, and trends in patient volume and the effects on quality care and cost.

In regards to PAs in Arizona there is not much information on trends and characteristics. Additional information through survey form would aid in gathering more information on PAs, such as additional demographic information (i.e. race and age), employment characteristics, characteristics related to practice setting, supervising physician, time spent providing patient care, employment satisfaction, reasons for practicing in AZ, education level, and prescription authorization.

Collection of additional information will assist in understanding the characteristics and trends PAs who practice in the state of Arizona.

Part V. Summary & Conclusions

The 2008 renewal cycle marked the first use of the revised data collection instrument for nurses and the first year in which data were collected on the pharmacy workforce and physician assistants. Some highlights of the results are:

- Registered Nurses
 - The objective of reaching 825 Registered Nurses in Arizona by the year 2017 requires a net increase of 49,000 registered nurses.
 - Given existing attrition rates, the achievement of the 825 ratio will require the entry of 75,000 new RNs into the Arizona workforce by 2017.
 - Achievement of the 825 ratio does not guarantee that the supply of nursing services to direct patient care will be adequate because approximately one-quarter to one-third of RNs who are employed in nursing do not provide patient care.
 - Among Advanced Practice Nurses, the ratio of nurse practitioners to population is higher than the national average while all the other specialty groups among APNs are below the national averages.
 - The data on APNs are not yet sufficient to predict future trends in supply
 - The analysis of the LPN workforce is limited because, among other factors, the LPN license is frequently obtained as a means of acquiring advanced standing in training to be RNs.
- Pharmacists and Pharmacy Technicians
 - The ratio of pharmacists to population in Arizona is higher than the national average and the predicted trend is for it to remain so. The increase may, not however, represent a sufficient increase to offset increase in demand for services associated with the rapid aging of Arizona's population.
 - There is a continuing shift in the employment of pharmacists from independent pharmacies to retail chain pharmacies
 - The pharmacy workforce is relatively young. Attrition rates due to aging can, therefore, be expected to be relatively low for many years.

- The supply of pharmacy technicians is likely to remain relatively constant or decrease slightly, but the proportion of technicians with PTCB certification is likely to increase.
- Physician Assistants
 - The physician assistants are the only health professionals in this report whose data are limited to the information collected for licensing. It is hoped to add survey questions to the applications for licenses in the future.
 - Physician Assistants are a very important component of the health care workforce since they disproportionately practice in rural areas, partially compensating for the pronounced shortage of physicians in these areas.

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Appendix A: Summary of Revisions to Data Collection Protocols

Data Issues

Originally, the data from the ABON included information obtained as part of the licensing process and data from responses to questions that were not part of the licensing process. Those questions that were not part of the licensing process were considered ‘survey questions,’ designed as a separate set of questions represented by a survey instrument, where copies of the survey were used by AzHHA, ABON, and ASU as the reference document for analysis of data from survey questions. It was determined that the survey questions were not included as a separate block of questions but interwoven among questions required for the licensing process. Restrictions on the Board of Nursing’s software also made it necessary to omit some of the questions. Therefore, many survey questions described on the survey instrument that had been used as a reference were omitted from the licensing application, and the survey questions were not added until May 18, 2007, thus not all nurses who submitted renewals completed a form that included any survey questions.

A “Survey Monkey” was pilot tested in January 2008, resulting in additions to the existing employment status section of the renewal survey to better define and understand the nursing workforce. These changes included clarification on; (a) nursing role, (b) clinical area, (c) employment setting, (d) whether the nursing position involved providing direct care to patients / clients, (e) actual numbers of hours worked per week, (f) number of weeks worked per month, and (g) number of months worked per year in 2007. Corrections to the existing dataset were also made, resulting in a more accurate reflection of the nursing workforce based on actual hours worked, anticipated retirement and/or attrition from nursing, statistics on Arizona’s rapidly growing population, and enrollment in one of the state’s nursing programs.

It was understood that the number of RNs employed in nursing was not an estimate of the supply of nursing services because nursing services supply also depends on hours and weeks of work (hours worked per average week, weeks worked per month, and months the applicant works on average each year), as well as measure of productivity. Therefore, significant changes were made to the employment questions to obtain a better understanding of actual workforce

needs. In addition to the previous described questions on retirement, the following employment questions were included in the revised survey:

Approximate number of months worked during 2007:

- 10-12
- 7-9
- 4-6
- 1-3
- <1

Approximate number of weeks usually worked per month during 2007:

- 4
- 3
- 2
- 1
- <1

Approximate number of hours usually worked per week during 2007:

- >41
- 36-40
- 24-35
- 13-23
- 1-12

Once the new survey questions were added to the license renewal process in 2008, we obtained similar baseline and socio-demographic information on the State's LPN and Advanced Practice RN pool. With this information, accurate and timely projections of the supply Arizona's nursing workforce (registered nurses, licensed practical nurses, and advanced practice nurses) can be obtained. Using the successful physician workforce licensing project as a model, we can correctly assess the state-wide health care workforce (physicians and nurses) for the first time.

The definition of 'employed in nursing' was also clarified and defined as 'any paid position that requires an active nursing license is considered to be an employed position in nursing. Direct patient care is not a requirement.' Coding restrictions were also eliminated (minimized?) that

allowed us to retrieve significantly more information concerning the characteristics of registered nurses during the licensing cycle.

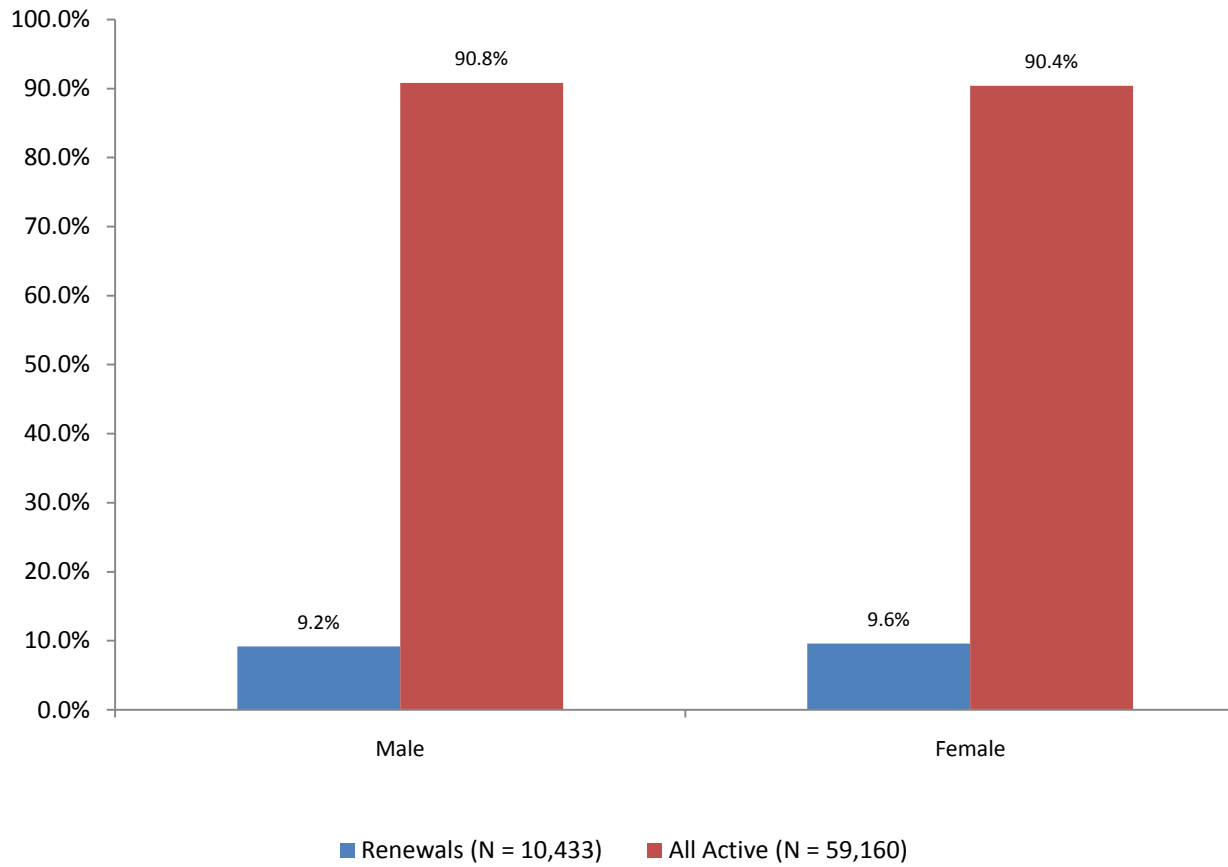
To better assess the influence of the aging workforce on Arizona's nursing supply, a retirement question was added to the licensing survey, consisting of the following question:

When do you plan to retire?

- Next year
- 2 – 5 years from now
- 6 – 9 years from now
- 10 – 15 years from now
- No specific time in mind
- Already retired

This permitted us to retrieve substantially more information concerning the characteristics of registered nurses and their intention on remaining in the workforce, because there was no practical method for correcting the limitation on the data obtained from previous licensing cycles.

Appendix Figure A1. 2008 Renewals vs. All Active RNs with AZ Address, by Gender, 2007



Source: ABON data, 2008.

Note: 8 renewal records were missing response to this question; 213 active RN with AZ address records were missing response to this question.

Appendix B: LPNs

Appendix Table B1. Characteristics of LPNs with Active Licenses & Survey Participants Who Live in Arizona, 2008

	<i>Licensed Pharmacists</i>		<i>Survey Participants</i>	
	<i>Number</i>	<i>Percent</i>	<i>Number</i>	<i>Percent</i>
Total	10,493	100.0	2,306	100.0
Age Group				
Less than 25	669	6.4	255	11.1
25-35	2,179	20.8	587	25.5
35-45	2,227	21.2	506	21.9
45-55	2,756	26.3	514	22.3
55-65	2,144	20.4	379	16.4
65-75	479	4.6	62	2.7
75+	39	0.4	3	0.1
Less than 25	669	6.4	255	11.1
Gender				
Male	1,176	11.2	268	11.6
Female	9,311	88.7	2,037	88.3
Unknown	6	0.1	1	0.0
Ethnicity				
White - Not of Hispanic Origin	6,669	63.6	1,392	60.4
Black - Not of Hispanic Origin	690	6.6	160	6.9
American Indian/Alaskan	194	1.8	40	1.7
Asian Pacific/Islander	283	2.7	75	3.3
Hispanic	1,211	11.5	307	13.3
Other	269	2.6	72	3.1
Multi Racial	3	0.0	1	0.0
Unknown	1,174	11.2	259	11.2
Marital Status				
Divorced	2,365	22.5	498	21.6
Married	5,476	52.2	1,127	48.9
Never Married	1,593	15.2	433	18.8
Separated	235	2.2	51	2.2

Widowed	342	3.3	87	3.8
Unknown	482		110	4.8
Clinical Area				
Generalized Community Health	755	7.2	102	4.4
Geriatric	1,964	18.7	453	19.6
Informatics	29	0.3	7	0.3
Medical/Surgical	675	6.4	149	6.5
Obstetric	148	1.4	31	1.3
Other	1,413	13.5	355	15.4
Pediatric	91	0.9	70	3.0
Psychiatric/Mental Health	254	2.4	58	2.5
Special Care	551	5.3	48	2.1
Telehealth	63	0.6	15	0.7
Unknown	4,550	43.4	1,018	44.1
County				
Apache	61	0.6	20	0.9
Cochise	300	2.9	55	2.4
Coconino	104	1.0	15	0.7
Gila	131	1.2	30	1.3
Graham	87	0.8	18	0.8
Greenlee	20	0.2	7	0.3
La Paz	21	0.2	8	0.4
Maricopa	6,117	58.3	1,347	58.4
Mohave	286	2.7	60	2.6
Navajo	154	1.5	38	1.7
Pima	1,918	18.3	393	17.0
Pinal	691	6.6	186	8.1
Santa Cruz	64	0.6	20	0.9
Yavapai	277	2.6	47	2.0
Yuma	214	2.0	45	2.0
Unknown	48	0.5	17	0.7

Source: ABON survey data, 2008.

Appendix C: Pharmacy Workforce

Appendix Table C1. Projection of Population and Growth Rate Relative to 2000 for All Residents and Residents over Age 65, Arizona & U.S., 2000-2020

	<i>Arizona</i>				<i>United States</i>			
	<i>Total</i>	<i>Growth Rate</i>	<i>65+</i>	<i>Growth Rate</i>	<i>Total</i>	<i>Growth Rate</i>	<i>65+</i>	<i>Growth Rate</i>
2000	5,130,632		667,839		282,158,336		35,107,491	
2001	5,307,331	3.4%	690,995	3.5%	284,915,024	1.0%	35,353,275	0.7%
2002	5,472,750	6.7%	712,228	6.6%	287,501,476	1.9%	35,612,391	1.4%
2003	5,629,870	9.7%	732,738	9.7%	289,985,771	2.8%	35,943,004	2.4%
2004	5,832,150	13.7%	756,119	13.2%	292,805,643	3.8%	36,316,940	3.4%
2005	6,044,985	17.8%	784,595	17.5%	295,583,436	4.8%	36,746,912	4.7%
2006	6,239,482	21.6%	850,341	27.3%	298,442,420	5.8%	37,225,660	6.0%
2007	6,432,007	25.4%	886,480	32.7%	301,279,593	6.8%	37,864,355	7.9%
2008	6,629,454	29.2%	925,698	38.6%	304,228,257	7.8%	38,691,335	10.2%
2009	6,812,137	32.8%	963,701	44.3%	307,212,123	8.9%	39,472,928	12.4%
2010	6,999,810	36.4%	1,002,539	50.1%	310,232,863	9.9%	40,228,712	14.6%
2011	7,186,070	40.1%	1,045,252	56.5%	313,232,044	11.0%	41,122,905	17.1%
2012	7,370,993	43.7%	1,097,234	64.3%	316,265,537	12.1%	42,559,570	21.2%
2013	7,554,429	47.2%	1,149,912	72.2%	319,330,342	13.2%	43,990,465	25.3%
2014	7,736,022	50.8%	1,202,051	80.0%	322,422,965	14.3%	45,370,695	29.2%
2015	7,915,629	54.3%	1,255,936	88.1%	325,539,790	15.4%	46,836,822	33.4%
2016	8,093,110	57.7%	1,309,471	96.1%	328,677,531	16.5%	48,266,965	37.5%
2017	8,268,253	61.2%	1,364,891	104.4%	331,833,494	17.6%	49,780,493	41.8%
2018	8,441,095	64.5%	1,422,212	113.0%	335,005,223	18.7%	51,367,396	46.3%
2019	8,611,507	67.8%	1,482,185	121.9%	338,190,395	19.9%	53,022,912	51.0%
2020	8,779,567	71.1%	1,543,686	131.1%	341,386,665	21.0%	54,804,470	56.1%

Source: U.S. Bureau of the Census; Arizona Department of Economic Security

Appendix Table C2. Projection of Active Pharmacists per 10,000 Residents, Arizona & U.S., 2000-2020

Year	AZ			U.S.		
	Pharmacist with Active License (1)	Active Pharmacist per 100,000 Resident Population (2)	Active Pharmacist per 100,000 Resident Population (Age >=65) (3)	Active Pharmacist	Active Pharmacist per 100,000 Resident Population	Active Pharmacist per 100,000 Resident Population (Age >=65)
2000	3642	68.0	522.4			
2001	3825	69.0	530.3			
2002	4117	72.1	553.8			
2003	4385	74.6	573.3			
2004	4617	75.8	585.0	226,400	77.3	623.4
2005	4961	78.6	605.7	230,100	77.9	626.2
2006	5306	81.5	597.8	233,100	78.2	626.2
2007	5540	82.5	598.7	237,000	78.8	625.9
2008	5486	79.3	567.7	241,500	79.5	624.2
2009	5943	83.6	590.8	246,200	80.4	623.7
2010	6201	84.9	592.5	251,100	81.3	624.2
2011	6459	86.1	592.0	256,000	82.2	622.5
2012	6717	87.3	586.4	261,100	83.1	613.5
2013	6975	88.4	581.1	266,200	84.0	605.1
2014	7232	89.6	576.4	271,400	84.9	598.2
2015	7490	90.7	571.3	276,700	85.8	590.8
2016	7748	91.7	566.9	282,100	86.8	584.5
2017	8006	92.8	561.9	287,700	87.8	577.9
2018	8264	93.8	556.7	293,300	88.8	571.0
2019	8522	94.8	550.8	299,200	89.8	564.3
2020	8780	95.8	544.9	305,000	90.8	556.5

Source: U.S. pharmacists data was derived from the report “The Adequacy of Pharmacist Supply: 2004-2030” (HRSA 2008)

Arizona pharmacist data 2000-2007 was derived from ASBP annual reports, 2008 from ASBP Pharmacist Licensure Database Obtained in February 2009, 2009-2020 data is projected based on 2000-2008 numbers using Least-square method

*Note: 95.8% of pharmacists with active licenses living in Arizona actually work as active pharmacists.

(2) = (1)*95.8%/100,000/population; (3) = (1)*95.8%/100,000/population >= 65

Appendix Table C3. Characteristics of Pharmacists with Active Licenses & Survey Participants Who Live in Arizona, 2008

	<i>Licensed Pharmacists</i>		<i>Survey Participants</i>	
	<i>Number</i>	<i>Percent</i>	<i>Number</i>	<i>Percent</i>
Total	5,486	100.0	2,422	100.0
Age Group				
<30	319	5.8	131	5.4
30-40	1,341	24.4	577	23.8
40-50	1,032	18.8	455	18.8
50-60	1,093	19.9	456	18.8
60-70	727	13.3	278	11.5
70-80	222	4.1	80	3.3
80+	50	0.9	12	0.5
Unknown	702	12.8	433	17.9
Years of Experience				
< 5	1,808	33.0	907	37.4
5-10	1,060	19.3	445	18.4
10-15	766	14.0	326	13.5
15-20	442	8.1	192	7.9
20-25	434	7.9	167	6.9
25-30	365	6.7	152	6.3
30-35	312	5.7	126	5.2
35+	296	5.4	107	4.4
Unknown	3	0.1	0	0.0
Employment Sector				
Chain	2,482	45.2	1,034	42.7
Community	72	1.3	31	1.3
Government	228	4.2	85	3.5
Hospital	858	15.6	388	16.0
Independent	164	3.0	62	2.6
Infusion	22	0.4	11	0.5
Other	979	17.8	387	16.0
Unknown	681	12.4	424	17.5
Foreign				

U.S. Graduate	4,689	85.5	1,953	80.6
Foreign Graduate	163	3.0	66	2.7
Unknown	634	11.6	403	16.6
Degree				
B.S. or Other	3,581	65.3	1,473	60.8
PhD.	1,271	23.2	546	22.5
Unknown	634	0.1	403	16.6

Source: Arizona State Board of Pharmacy Pharmacist Licensure Database Obtained in February 2009

Appendix Table C4. Pharmacists with Active Licenses Living in Arizona per 10,000 Residents by County, 2008

<i>County</i>	<i>Number*</i>	<i>Percent</i>	<i>Population</i>	<i>Ratio</i>
Apache	10	0.2	76,156	13.1
Cochise	52	0.9	139,434	37.3
Coconino	98	1.8	135,613	72.3
Gila	33	0.6	57,361	57.5
Graham	19	0.3	38,633	49.2
Greenlee	0	0.0	8,950	0.0
La Paz	2	0.0	21,544	9.3
Maricopa	3,676	67.0	3,987,942	92.2
Mohave	107	2.0	205,862	52.0
Navajo	43	0.8	114,780	37.5
Pima	1,036	18.9	1,014,023	102.2
Pinal	148	2.7	350,558	42.2
Santa Cruz	14	0.3	47,471	29.5
Yavapai	146	2.7	227,348	64.2
Yuma	70	1.3	203,779	34.4
Unknown	32	0.6		

Source: Pharmacist Licensure Database, February 2009

*Note: Pharmacists with active licenses living in Arizona.

Appendix Table C5. Employment Setting by Gender, Arizona, 2008

	<i>Current Setting (N = 1,819)</i>			<i>Previous Setting (N = 1,561)</i>		
	<i>Male</i>	<i>Female</i>	<i>Total</i>	<i>Male</i>	<i>Female</i>	<i>Total</i>
Chain	546	506	1052	449	396	845
Hospital	194	253	447	179	193	372
Independent	37	23	60	68	60	128
Mail Order	59	41	100	24	26	50
Government	32	38	70	26	20	46
Other Patient Care	34	24	58	44	28	72
Indirect/Other Services	17	15	32	30	18	48

Source: Pharmacist Licensure Database, February 2009

Appendix Table C6. Current Employment Setting and Previous Employment Setting, Arizona 2008 (N = 1,521)

<i>Previous Employment Setting</i>	<i>Current Employment Setting</i>						
	<i>Chain</i>	<i>Hospital</i>	<i>Independent</i>	<i>Mail Order</i>	<i>Government</i>	<i>Other Patient Care</i>	<i>Indirect/Other Services</i>
Chain	608	86	28	62	18	20	8
Hospital	73	256	2	3	7	11	9
Independent	83	9	17	4	3	3	1
Mail Order	18	7	3	17	2	2	0
Government	12	7	2	0	22	1	2
Other Patient Care	19	18	2	7	3	17	2
Indirect/Other Services	23	9	2	3	2	2	6

Source: Pharmacist Licensure Database, February 2009

Appendix Table C7. Number of New Graduates by College of Pharmacy, Arizona, 2000-2008

<i>Year</i>	<i>Midwestern University</i>	<i>University of Arizona</i>	<i>Total</i>
2000	0	56	56
2001	93	58	151
2002	86	57	143
2003	91	50	141
2004	120	45	165
2005	122	64	186
2006	125	69	194
2007	135	75	210
2008	127	76	203

Source: Midwestern University and University of Arizona School of Pharmacy

Appendix Table C8. Characteristics of Pharmacy Technicians with Active Licenses & Survey Participants Who Live in Arizona, 2008

	<i>All Technician</i>		<i>PCTB</i>		<i>Survey Participants</i>	
	<i>Number</i>	<i>Percent</i>	<i>Number</i>	<i>Percent</i>	<i>Number</i>	<i>Percent</i>
Total	11,372	100.0	7,114	100.0%	1,413	100.0
Age Group						
Less than 25	1,295	11.4%	806	11.3%	208	14.7%
25-35	2,016	17.7%	1,559	21.9%	353	25.0%
35-45	1,005	8.8%	822	11.6%	179	12.7%
45-55	854	7.5%	711	10.0%	148	10.5%
55-65	506	4.4%	412	5.8%	75	5.3%
65-75	93	0.8%	75	1.1%	6	0.4%
75+	10	0.1%	9	0.1%	0	0.0%
Unknown	5,593	49.2%	2,720	38.2%	444	31.4%
Employment Type						
Technician (PTCB)	7,114	62.6%	7,114	100.0%	1,413	100.0%
Technician Trainee	4,258	37.4%		0.0%		0.0%

Source: Arizona State Board of Pharmacy's Pharmacy Technician Licensure Database Obtained in February 2009 and 2008 Pharmacy Technician Survey

Appendix Table C9. Projection of Active Pharmacy Technicians per 10,000 Residents, Arizona & U.S., 2000-2020

	<i>Pharmacy Technician with Active License</i>	<i>Active Pharmacy Technician per 100,000 Resident Population</i>	<i>Ratio</i>
2005	10,637	147.3	1.9
2006	13,941	187.0	2.3
2007	13,236	172.2	2.1
2008	11,372	143.6	1.8
2009	12,672	155.7	1.9
2010	12,822	153.3	1.8
2011	12,972	151.1	1.8
2012	13,122	149.0	1.7
2013	13,272	147.0	1.7
2014	13,422	145.2	1.6
2015	13,572	143.5	1.6
2016	13,722	141.9	1.5
2017	13,872	140.4	1.5
2018	14,022	139.0	1.5
2019	14,172	137.7	1.5
2020	14,322	136.5	1.4

Data Source: Arizona pharmacy technician data 2005-2007 was derived from ASBP annual reports, 2008 from ASBP Pharmacy Technician Licensure Database Obtained in February 2009, 2009-2020 data is projected based on 2005-2008 numbers using Least-square method

*Note: 83.7% of pharmacy technicians with active license residing in Arizona actually work as active pharmacy Technicians.

Appendix D: Physician Assistant License Application

7. Have you ever had any application for any professional license refused or denied by any licensing authority?	YES <input type="checkbox"/>	NO <input type="checkbox"/>
8. Have you ever been refused or denied the privilege of taking an examination required for any professional licensure?	YES <input type="checkbox"/>	NO <input type="checkbox"/>
9. Have you ever been dropped, suspended, placed on probation, expelled, fined, resigned or been requested to resign from any Physician Assistant Training program or educational program in which you were enrolled?	YES <input type="checkbox"/>	NO <input type="checkbox"/>
10. Has any training program taken action against you including probation, restriction, suspension, revocation, modification, accepted resignation, asked you to leave temporarily or permanently?	YES <input type="checkbox"/>	NO <input type="checkbox"/>
11. Have you ever voluntarily surrendered any healthcare license?	YES <input type="checkbox"/>	NO <input type="checkbox"/>
12. Have you ever had any healthcare license revoked?	YES <input type="checkbox"/>	NO <input type="checkbox"/>
13. Have you ever been the subject of disciplinary action or are you currently under investigation with regard to your healthcare license, been sanctioned by any healthcare licensing authority, healthcare association, licensed healthcare facility or healthcare staff of such facility?	YES <input type="checkbox"/>	NO <input type="checkbox"/>
14. Have your privileges ever been restricted, terminated, voluntarily or involuntarily resigned or withdrawn by any healthcare licensing authority, healthcare association, licensed healthcare facility or healthcare staff of such facility?	YES <input type="checkbox"/>	NO <input type="checkbox"/>
15. Has disciplinary action been taken against you by any licensing agency with regard to any professional license? Including but not limited to restricted, terminated, voluntarily or involuntarily resigned or withdrawn.	YES <input type="checkbox"/>	NO <input type="checkbox"/>
16. Are there any pending complaints, investigations, or disciplinary actions against you with any healthcare licensing authority, healthcare association, licensed healthcare facility or healthcare staff of such facility?	YES <input type="checkbox"/>	NO <input type="checkbox"/>
17. Have you ever had a registration issued by a controlled substance authority (State or Federal) revoked, suspended, limited, restricted, modified, denied or have you surrendered or given up in lieu of action?	YES <input type="checkbox"/>	NO <input type="checkbox"/>
18. Have you ever been charged with or convicted, pardoned or had a record expunged or vacated of a felony, misdemeanor involving moral turpitude? (see explanation below) A "yes" answer is required even if you entered a diversion program.	YES <input type="checkbox"/>	NO <input type="checkbox"/>
19. Have you ever been charged with or convicted (including a nolo contendere plea or guilty plea) of a violation of any federal or state drug law(s) or rule(s) whether or not sentence was imposed or suspended?	YES <input type="checkbox"/>	NO <input type="checkbox"/>
20. In the last ten (10) years has a judgment or settlement been entered against you in excess of \$20,000 as a defendant in a medical malpractice suit? *Please <u>do not</u> report <u>pending</u> malpractice suits or <u>settlements paid not related to a civil action</u> .	YES <input type="checkbox"/>	NO <input type="checkbox"/>
21. Have you ever been court martialled or discharged other than honorably from the armed service?	YES <input type="checkbox"/>	NO <input type="checkbox"/>
22. Have you ever been terminated from a healthcare position with a city, county, or state government or the Federal government?	YES <input type="checkbox"/>	NO <input type="checkbox"/>
23. Have you ever been convicted of insurance fraud or received sanctions, including restrictions, suspension or removal from practice, imposed by any agency of the Federal government?	YES <input type="checkbox"/>	NO <input type="checkbox"/>

Note: In the event the response to any of the questions numbered 7 through 23 is "YES", the applicant must file with the application a detailed report concerning the above matters, including any charge, date of such charge, the complete name and address of all bodies of jurisdiction, the result of any hearings, and the disposition of such charge(s). IN ADDITION, the applicant must submit photocopies of any complaints, hearings, settlements or judgments together with copies of patient's hospital and/or office records to the Arizona Regulatory Board of Physician Assistants.

Moral Turpitude includes but is not limited to the following: Armed Robbery, Assault with a Deadly Weapon, Attempted Insurance Fraud, Fabricating and Presenting False Public Claim, False Reporting to Law Enforcement Agency, Falsification of Records of the Court, Forgery, Fraud, Hit & Run, Illegal Sale & Trafficking in Controlled Substances, Indecent Exposure, Kidnapping, Larceny, Mann Act (Federal Commercialization of Women Statute), Misleading Sale of Securities in Connection with Transfer of Real Property, Perjury, Possession of Heroin for Sale/Unlawful Sale or Dispensing Narcotic Drugs, Rape, Shoplifting and Soliciting Prostitution.

CONFIDENTIAL
Physical/Mental Health and Substance Abuse

1. Within the last five years, have you been diagnosed, treated or admitted to a hospital or other facility for the treatment of bi-polar disorder, schizophrenia, paranoia or any psychotic disorder?	YES <input type="checkbox"/>	NO <input type="checkbox"/>
2. Are you now or have you in the last 5 years been addicted to or abused any chemical substance including alcohol (excluding tobacco and caffeine)?	YES <input type="checkbox"/>	NO <input type="checkbox"/>
3. Are you now being treated or have you in the last 5 years been treated or evaluated for a drug or alcohol addiction or participated in a rehabilitation program? *If in a confidential program in another state see explanation below.	YES <input type="checkbox"/>	NO <input type="checkbox"/>
4. Have you ever been criminally charged with or investigated by any healthcare licensing authority, healthcare association, licensed healthcare facility or healthcare staff of such facility for inappropriate contact with a patient or patients?	YES <input type="checkbox"/>	NO <input type="checkbox"/>
5. Do you currently have any disease or condition that interferes with your ability to competently and safely perform the essential functions of your profession, include any disease or condition generally regarded as chronic by the medical community, i.e. (1) behavioral health illness or condition; (2) alcohol or other substance abuse; and/or (3) physical disease or condition, that may presently interfere with your ability to competently and safely perform the essential functions involved in your usual practice? See below for definition of ability to practice medicine.	YES <input type="checkbox"/>	NO <input type="checkbox"/>

In the event you answer YES to any of the above questions, you must file with the application a detailed written narrative statement concerning the above matter(s), including the name and address of all training programs or healthcare providers, physicians, preceptors, hospitals/rehabilitation centers, etc. where you were counseled/treated. You must also have a copy of your history and physical examinations, consultation reports, discharge summaries from all hospitals/rehabilitation centers and a statement from your attending physicians or treating therapists setting forth your diagnosis, prognosis and recommendations for continuing care, treatment, supervision and a statement as to whether there is anything that would prevent you from safely practicing any type of medicine. This must be sent directly to the Arizona Regulatory Board of Physician Assistants.

If you are currently participating or have participated pursuant to a CONFIDENTIAL AGREEMENT OR ORDER in a program for the treatment and rehabilitation of physician assistant's impaired by alcohol, drug abuse or for other issues YOU MUST SUBMIT A NARRATIVE OF CIRCUMSTANCES WITH YOUR APPLICATION AND REQUEST THE FOLLOWING DOCUMENTATION BE SENT DIRECTLY TO THE ARIZONA REGULATORY BOARD OF PHYSICIAN ASSISTANT'S HEALTH PROGRAM.

- Evaluation/Treatment records
- Psychiatric/Psychological records
- Compliance reports from state monitoring programs

Please note: All documents requested above must be sent directly from the primary source to the Arizona Regulatory Board's Physician Assistant Health Program Department from the primary source and will not be accepted if submitted by the applicant.

FAILURE TO PROPERLY ANSWER THESE QUESTIONS OR DISCLOSE ALCOHOL, SUBSTANCE ABUSE OR OTHER ISSUES CAN RESULT IN BOARD DISCIPLINARY ACTION, INCLUDING REVOCATION OR DENIAL OF A LICENSE.

If you have any questions, please contact the Board's Physician Health Program at (480) 551-2716 or (877) 255-2212.

Ability to practice medicine is to be construed to include all of the following:

1. The cognitive capacity to make appropriate clinical diagnoses and exercise reason medical judgments and to learn and keep abreast of medical developments;
2. The ability to communicate those judgments and medical information to patients and other healthcare providers, with or without the use of aids or devices, such as a voice amplifier; and
3. The physical capability to perform medical tasks such as physical examination and surgical procedures, with or without the use of aids or devices, such as corrective lenses or hearing aids.

"Medical condition" includes physiological, mental or psychological conditions or disorders, such as, but not limited to chronic and/or uncorrected orthopedic, visual, speech, or hearing impairments, epilepsy, multiple sclerosis, behavioral health illness, dementia, drug addiction and alcoholism.

The applicant _____

(Print or type Name)

being first duly sworn upon his oath deposes and says that I am the person above described and identified; that I have not engaged in any of the acts prohibited by the statutes of the State of Arizona, particularly those acts set forth in the Rules and Regulations of the Board. I hereby authorize all hospitals, institutions or organizations, my references, personal physicians, employers (past and present), business and professional associates (past and present), and all governmental agencies and instrumentality's (local, state, federal or foreign) to release directly to the Arizona P.A. Board, all information, files, records requested by the P.A. Board in connection with the processing of this application. I further authorize the P.A. Board to release to the organizations, individuals and groups listed above any information which is material to my application. I have carefully read the questions in the foregoing application and have answered them completely, without reservations of any kind, and I declare under penalty of perjury that my answers and all statements made by me herein are true and correct. I am the lawful holder of all credentials submitted and that the credentials submitted were not procured by fraud or misrepresentation or any mistake of which I am aware. Should I furnish false information in this application, I hereby agree that such act shall constitute cause for denial, suspension or revocation of my License to perform health care tasks as a physician assistant in the State of Arizona.

Under penalty of perjury I certify I am a U.S. Citizen or a qualified/registered alien.

Signature of Applicant: _____

Date: _____

ARIZONA LAW REQUIRES AN APPLICANT WHO HAS BEEN CHARGED WITH A FELONY OR A MISDEMEANOR INVOLVING CONDUCT THAT MAY AFFECT PATIENT SAFETY AFTER SUBMITTING THE APPLICATION TO NOTIFY THE ARIZONA REGULATORY BOARD OF PHYSICIAN ASSISTANTS WITHIN 10 DAYS AFTER THE CHARGE IS FILED. ARIZONA REVISED STATUTE (A.R.S.) §32-3208 (SEE WEBSITE UNDER *Physician Assistant Center – Reportable Misdemeanors* FOR LIST OF REPORTABLE MISDEMEANORS – ALL FELONIES ARE REPORTABLE.)

FOR P.A. BOARD STAFF USE ONLY - DO NOT WRITE IN THIS SPACE

Date Application received: _____

Inquiry Number: _____

Date application processed: _____

Processed by: _____

Date of Temporary approval: _____

Approved by: _____

Date Temporary License Issued: _____

Temporary License No.: _____

Date of Regular approval: _____

Approved by: _____

Date Regular License Issued: _____

Regular License No.: _____

TEMPORARY LICENSE CHECKLIST

If you are registered with the N.C.C.P.A. for the examination and you are applying for a **TEMPORARY LICENSE**, please submit only those items listed below.

Applications submitted without the application fee will not be accepted or processed until the fee has been received. Your application cannot be approved until **ALL** documentation has been received.

Failure to submit a completed application within one year from the date of the mailing by the board of a statement to the applicant of the deficiencies in the application pursuant to subsection E, will result in your application being withdrawn. **A.R.S. § 32-2522(G)**

Application fees are non-refundable.

The following items are to be completed and forwarded to the board.

- \$125.00 Application Fee (Upon approval you will be also invoiced the \$50.00 Temporary licensing fee)
- Completed Application
- Birth Certificate/Passport/Marriage License/Legal Name Change Documents
- Home Address, Phone Number & Social Security Number Form (for our records only)
- Temporary License Agreement Form
- Affidavit
- Detailed written narrative statement if you answered YES to any questions on the application, and accompanying documentation. (Including Malpractice form if applicable)

The applicant must forward the following enclosed forms to the appropriate entity for completion.

(When completed by the entity, these are to be sent directly to the Arizona Regulatory Board of Physician Assistants.)

- Request a letter from the N.C.C.P.A. sent directly to the P.A. Board that you are eligible for and registered to take the Physician Assistant National Certifying Examination (PANCE).
- Form 1 to be completed and submitted by your P.A. Program

If you are approved for a Temporary Certificate you will be invoiced the \$50 temporary fee.

Upon passing the examination you can request permanent licensure and you will be invoiced the pro-rated licensure fee.

REGULAR LICENSE CHECKLIST

If you are applying for a **REGULAR LICENSE**, please submit all items listed below.

Applications submitted without the application fee will not be accepted or processed until the fee has been received. Your application cannot be approved until **ALL** documentation has been received.

Failure to submit a completed application within one year from the date of the mailing by the board of a statement to the applicant of the deficiencies in the application pursuant to subsection E, will result in your application being withdrawn.

A.R.S. § 32-2522(G)

Application fees are non-refundable.

The following items are to be completed and forwarded to the board.

- \$125.00** Application Fee (Upon approval you will be invoiced a pro-rated initial licensing fee up to \$100.00)
- Completed Application
- Copy of Birth Certificate/Passport/Marriage License/Legal Name Change Documents
- Employment List of all physician assistant employment held since graduation or during the past five years
- Home Address, Phone Number & Social Security Number Supplement Form
- Affidavit
- Detailed written narrative statement if you answered YES to any question on the application and accompanying documentation. (Including Malpractice form if applicable)

The applicant must forward the following enclosed forms to the appropriate entity for completion. (If applicable)

(When completed by the entity, these are to be sent directly to the Arizona Regulatory Board of Physician Assistants.)

- Medical Agency of Employment Form/Supervising Physician Form to be completed by all employers listed on the Employment List;
- Form I to be completed and submitted by your P.A. Program;
- Authorize the N.C.C.P.A. to release your Physician Assistant National Certifying Examination (PANCE) scores directly to the P.A. Board.

If you are approved for licensure you will be invoiced the pro-rated licensure fee which is in addition to the application fee.

HOME ADDRESS AND SOCIAL SECURITY SUPPLEMENT FORM

P.A. APPLICANT'S FULL NAME: _____

BIRTHDATE: _____ SOCIAL SECURITY NO: _____

PLACE OF BIRTH: _____
(City) (State) (Country)

HOME ADDRESS: _____
(Street Address)

(City) (State) (Zip Code)

HOME TELEPHONE NUMBER: _____
() (Please include area code)

E-MAIL ADDRESS: _____

MAILING ADDRESS: _____
(Street Address)

(City) (State) (Zip Code)

A.R.S. §32-2527(A): In accordance with this statute, a residential address is not available to the public unless it is the only address of record.

CONFIDENTIAL INFORMATION – NOT FOR PUBLIC KNOWLEDGE

AGREEMENT FOR TEMPORARY LICENSURE PURSUANT TO A.R.S. §32-2524(F)

Pursuant to *A.R.S. §32-2524(F)*, this voluntary agreement is made between _____, P.A., and the Arizona Regulatory Board of Physician Assistants ("P.A. Board").

P.A. _____, holder of Temporary License no. _____ agrees and stipulates with the P.A. Board that he/she shall perform health care tasks under his/her Temporary License only at the same geographic work site where his/her supervising physician sees patients.

Any violation of this order constitutes unprofessional conduct as defined by *A.R.S. §32-2501(18)(ee)* and may result in disciplinary action pursuant to *A.R.S. §32-2551*.

**Arizona Regulatory Board
of Physician Assistants**

[S E A L]

Lisa Wynn, B.S.
Executive Director

Physician Assistant's Signature

Date: _____

Date: _____

Executed copy mailed this _____ day of _____, 200_ to the P.A.

P.A. Board Staff Member

AFFIDAVIT

STATE OF _____)

COUNTY OF _____)

I hereby certify that I have completely read, and will abide by the **ARIZONA REVISED STATUTES** pursuant to Chapter 25, and the **RULES AND REGULATIONS** pursuant to Chapter 17, governing the certification of physician assistants and the performance of health care tasks in the State of Arizona.

Dated this _____ day of _____, 20_____.

(Print or Type full Name of Physician Assistant)

(Signature of Physician Assistant)

NOTARY:

Sworn to before me this _____ day of _____, 20_____

(Notary Signature)

My Commission Expires On: _____.

ARIZONA REGULATORY BOARD OF PHYSICIAN ASSISTANTS
9545 E. Doubletree Ranch Road, Scottsdale, Arizona 85258, Ph: 480-551-2700, Fax: 480-551-2704

FORM I – PHYSICIAN ASSISTANT TRAINING PROGRAM CERTIFICATION

Part of the application for certification as a physician assistant in the State of Arizona requires this form to be completed by the physician assistant training program where the physician assistant applicant received training as a physician assistant. The physician assistant applicant must forward this form for completion by an officer of the physician assistant training program which granted the physician assistant's degree.

I hereby authorize the release of all information in your files, favorable or otherwise, directly to: The Arizona Regulatory Board of Physician Assistants, 9545 E. Doubletree Ranch Road, Scottsdale, Arizona 85258.

(Physician Assistant Signature)

(Printed/Typed Physician Assistant Name)

To Be Completed by the Physician Assistant Training Program:

This is to certify that _____ was granted the degree of _____ on _____, 20_____.

Dates attended _____ to _____
(Month/Day/Year) (Month/Day/Year)

NOTE: IF THE ANSWER IS YES TO ANY OF THE QUESTIONS, PLEASE ATTACH A WRITTEN EXPLANATION

1. Was the student ever required to repeat any segment of training? Yes No
2. Were any actions, restrictions, limitation (including probation or academic probation) taken while the student was participating in your training program? Yes No
3. Was the student ever counseled regarding his/her performance or behavior in your training program? Yes No
4. Were the student's final evaluations in every category rated satisfactory and/or above? Yes No
If No, please attach a photocopy of the evaluation and a written explanation.
5. Did the student have any medical condition which in any way impairs or limits his/her ability to safely practice any type of health care tasks within the scope of the physician assistant? Yes No

Ability to practice medicine is to be construed to include all of the following:

1. The cognitive capacity to make appropriate clinical diagnoses and exercise reason medical judgments and to learn and keep abreast of medical developments;
2. The ability to communicate those judgments and medical information to patients and other healthcare providers, with or without the use of aids or devices, such as a voice amplifier; and
3. The physical capability to perform medical tasks such as physical examination and surgical procedures, with or without the use of aids or devices, such as corrective lenses or hearing aids.

“Medical condition” includes physiological, mental or psychological conditions or disorders, such as, but not limited to chronic and/or uncorrected orthopedic, visual, speech, or hearing impairments, epilepsy, multiple sclerosis, behavioral health illness, dementia, drug addiction and alcoholism.

Signature: _____

Name & Title: _____

P.A. Program Name: _____

Address: _____

[SEAL OF TRAINING PROGRAM]
(If none, indicate so)

Date: _____

ARIZONA REGULATORY BOARD OF PHYSICIAN ASSISTANTS
9545 E. Doubletree Ranch Road, Scottsdale, Arizona 85258, Ph: 480-551-2700, Fax: 480-551-2704

MEDICAL AGENCY OF EMPLOYMENT/SUPERVISING PHYSICIAN FORM

Part of the application for certification as a physician assistant in the State of Arizona requires that this form be completed by ALL current and past Medical Agencies/Supervising Physicians where the applicant is or has been employed as a physician assistant for the past five (5) annual years.

MEDICAL AGENCY OF EMPLOYMENT/SUPERVISING PHYSICIAN: I hereby authorize the release of all information in your files, favorable or otherwise, directly to: The Arizona Regulatory Board of Physician Assistants, State of Arizona, 9545 E. Doubletree Ranch Road, Scottsdale, Arizona 85258.

(Physician Assistant Signature)

(Printed/Typed Physician Assistant Name)

TO BE COMPLETED BY THE MEDICAL AGENCY OF EMPLOYMENT/SUPERVISING PHYSICIAN

NAME AND ADDRESS OF MEDICAL AGENCY/SUPERVISING PHYSICIAN: _____

Dates of Employment: From: _____ To: _____

Names, locations and dates of each hospital/office/clinic wherein the physician assistant was/is assigned: _____

1. Were any actions, restrictions, limitations (including probation) taken while in your employment? Yes No

2. List of healthcare tasks delegated to PA : _____

3. Were any limitations imposed on such health care tasks? Yes No If Yes, please explain: _____

4. Were any health care tasks ever removed or restricted? Yes No If Yes, please explain: _____

5. Derogatory information, if any: _____

6. Names of other medical agencies of employment or supervising physicians, if known (list name, city and state):

1. _____

2. _____

3. _____

Signed: _____

[SEAL OR STAMP]
(If none, indicate so)

Name & Title: _____

Medical Agency/Supervising Physician: _____

Address: _____

Date: _____

ARIZONA REGULATORY BOARD OF PHYSICIAN ASSISTANTS
9545 E. Doubletree Ranch Road, Scottsdale, Arizona 85258, Ph: 480-551-2700, Fax: 480-551-2704

PHYSICIAN ASSISTANT EMPLOYMENT LIST

APPLICANTS: List all current and/or previous employment with medical agencies/supervising physicians, i.e., physician assistant placement group, private practice, hospital, clinic, etc., for the past five (5) years, and return this form with your application.

If you have been in the military since graduating from a P.A. Program, do not have an Agency of Employment/Supervising Physician form completed. Have your Commanding Officer submit a letter providing the dates of active duty and anticipated date of release, along with a summary of your duties.

Physician Assistant Applicant's Name: _____

Agency/Supervising Physician Name: _____

Address: _____

(CITY) (STATE) (ZIP)
Dates of Employment: FROM: _____ **TO:** _____

Agency/Supervising Physician Name: _____

Address: _____

(CITY) (STATE) (ZIP)
Dates of Employment: FROM: _____ **TO:** _____

Agency/Supervising Physician Name: _____

Address: _____

(CITY) (STATE) (ZIP)
Dates of Employment: FROM: _____ **TO:** _____

Agency/Supervising Physician Name: _____

Address: _____

(CITY) (STATE) (ZIP)
Dates of Employment: FROM: _____ **TO:** _____

MALPRACTICE ADDENDUM

The applicant must complete this form for each malpractice settlement or judgment in the last ten (10) years. If more than one case, please make copies of this form and return with required documents. Please report only the settlement of a civil action.

Applicant Name _____, P.A.

1. On a separate sheet of paper type your full name and provide a detailed clinical narrative regarding each malpractice case(s). Include name of patient, age, sex, date of occurrence and location (include address). Do not omit the answers to these questions or make reference to attached documents for answers. This section must be completed with your own description that includes all of the facts requested above. *NOTE: HIPAA regulations do not prevent you from responding and providing the requested information.*
2. What was the amount and date of the judgment or settlement? _____
Amount Date
3. Amount of judgment or settlement attributed to you _____
4. Has this case been investigated or reviewed by any State Medical Board? Yes No
If answer is "Yes", request letter of resolution from State Medical Board be sent directly to us. You do not need to attach the documents listed below if the case has been investigated or reviewed by any State Medical Board.

You are required to attach the following for each case:

- Copy of plaintiff's complaint
- Copy of Judgment or Settlement Agreement
- Copy of complete set of medical records including x-rays or diagnostic films

* X-rays and diagnostic films must be included. Your application cannot be processed without them.

I certify that the information which I have provided is correct to the best of my knowledge.

Signature

Date

Your application is not administratively complete until all documents are received.



Arizona Regulatory Board of Physicians Assistants

**PAYMENT CARD AUTHORIZATION
PHYSICIAN ASSISTANT LICENSE APPLICATION FEE**

Payment for: _____ PA

Physician Assistant Application Fee \$125

Type of Card: Visa MasterCard

Card #: - - -

Expiration Date: - (MM-YY)

Name as Shown on Payment Card: _____

Billing Address of Cardholder:

(Required)

Street Address: _____

City: _____ State: _____ Zip: _____

Phone Number of Cardholder: _____

(Required)

Mailing Address of Cardholder: (If different from billing address):

Street Address: _____

City: _____ State: _____ Zip: _____

Signature of Cardholder: _____

Date: _____

Please complete and return this form with your *Regular license application* if paying by credit card.
(If you fax your fee payment, please **DO NOT** mail in the original form as you may be charged a second time. Thank you!)

Fax Number: 480-551-2704

Mailing Address: Arizona Regulatory Board of Physician Assistants, 9545 E. Doubletree Ranch Road, Scottsdale, AZ 85258