The Supply of Physician Assistants, Nurse Practitioners, and Certified Nurse Midwives in Arizona

A report prepared for the:

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Acronyms

ACA	Patient Protection and Affordable Care Act
AHCCCS	Arizona Health Care Cost Containment System is Arizona's Medicaid agency
AHEC	Area Health Education Center Program
APRN	advanced practice registered nurses
ARS	Arizona Revised Statutes http://www.azleg.gov/ArizonaRevisedStatutes.asp
ASAPA	Arizona State Association of Physician Assistants
Az	Arizona
AzSBN	Arizona State Board of Nursing
CAH	critical access hospital
CI	confidence interval
CMS	US HHS's Centers for Medicare and Medicaid Services
CNM	certified nurse midwife
CON	College of Nursing
CRH	Center of Rural Health, the University of Arizona
DGME	direct graduate medical education
DNP	doctor of nursing practice
DPC	direct patient care
Flex	Medicare Rural Hospital Flexibility Program
FPL	federal poverty level
FQHC	federally qualified health centers
FTE	full time equivalent
GME	graduate medical education
HHS	US Department of Health and Human Services
HIPAA	Health Insurance Portability and Accountability Act
HPSA	Health Professional Shortage Areas
HRSA	US HHS's Health Resources and Services Administration
IHS	Indian Health Service
IME	indirect medical education
IRS	US Internal Revenue Service
Marketplace	Health Insurance Marketplace
MUA/P	medically underserved areas, and medically underserved populations
NHSC	National Health Service Corp
NP	nurse practitioner
PA	physician assistant
RHC	rural health clinic
RUCA	rural-urban commuting area
SAS EG	SAS Enterprise Guide
SHIP	Small Rural Hospital Improvement Program
SPA	state plan amendment
THC	teaching health centers
UA	University of Arizona
US	United States

Contents

Executive Summary

The Arizona Area Health Education Centers Program (AzAHEC) commissioned ***The Supply of Physician Assistants, Nurse Practitioners, and Certified Nurse Midwives in Arizona***.

Assuring access to high quality health care requires:

1) An adequate ***supply and distribution*** of health services, through the training, recruitment, and retention of the health workforce.
2) Efficient ***use*** of health practitioners practicing to the full extent of their education and training.
3) Physical, financial and timely ***access*** to high quality health care and services.

When this triad is off balance disparities in health outcomes appear. Health workforce data, trends and analysis can alert policymakers to deficits in access, supply, distribution, and cost efficient use of health services. These inform public and private sector interventions and policies to assure access to high quality, high value health care for all Arizonans.

Arizona has a strong health infrastructure to build on, and unprecedented opportunities to transform its health system. In rural Arizona, 15 critical access hospitals (CAHs), community health centers including 20 federally qualified health centers (FQHCs) with clinics in over 60 communities and rural health clinics (RHCs) in over 20 cities, and Indian Health Service (IHS) sites in the Phoenix Area and Tucson Area IHS, and others provide crucial health services, jobs, and economic benefits. Yet Arizona has unique challenges – it has two large urban and many widely dispersed rural populations, a high percentage of uninsured overall, and uninsured rates exceeding 30% in rural, border, Hispanic/Latino and American Indian populations. Many face poverty, unemployment and limited access to health care.

Rural Arizona has fewer providers compared to urban areas. Overall 11% of PA, NP, and CNM providers work in rural areas, and serve 15% of Arizona's population. Most (89%) work in urban Arizona. Of the 3,068 nurse practitioners (NPs), 91% are in urban Arizona, of the 182 certified nurse midwives (CNMs) 82% and of the 2,039 physician assistants (PAs) 87% are urban. Too few providers delays necessary care, worsens health outcomes and increases costs through greater hospital and emergency department use. Oversupply is associated with unnecessary procedures, poorer health outcomes, and higher costs. Fine scale geographical data, such as postal zip codes, can elucidate whether a population is underserved, adequately served or oversupplied for specialty and primary care.

Primary care[a] is recognized as a cornerstone in population health. However, many physicians and other clinical providers subspecialize and work in urban areas, reducing the primary care workforce in rural areas. NPs, CNMs, PAs are crucial to primary care capacity and provide high quality care. Yet few studies assess their important contribution to a well-functioning, accessible health system.

The Supply of Physician Assistants, Nurse Practitioners, and Certified Nurse Midwives in Arizona used licensing board data, training and graduation numbers from PA and NP colleges, and interviews with

[a] The Institute of Medicine defined primary care as the provision of integrated, accessible health care services by clinicians who are accountable for addressing a large majority of personal health care needs, developing a sustained partnership with patients, and practicing in the context of family and community. http://www.nap.edu/openbook.php?record_id=9153&page=1

individual PAs, NPs, and CNMs. The study calculates Arizona's provider to population ratio, compares it to the national average, reports the number of PA, NP, and CNM providers attending Arizona schools by specialty and primary care, and estimates the number needed in Arizona to meet national benchmarks. Recommendations are made to improve provider supply and distribution to areas of need, enhance access to health care in rural areas, and increase the PA, NP, and CNM provider workforce.

Key Findings of the PA, NP, and CNM Arizona Workforce Study:

- The Arizona health workforce is aging - 54% of CNMs, 41% of NPs, 26% of PAs are age 55 or older;
- Many plan to retire in the next ten years;
- Many choose where to practice based on job description and location;
- Only 58% of PAs, 54% of NPs and 50% of CNMs accept new Medicare/Medicaid patients;
- The majority of PAs, NPs, CNMs work in direct patient care, and over 40 hours a week;
- Rural Arizona has fewer NP and PA providers per capita than urban areas;
- Urban Arizona has fewer CNMs per capita than rural areas;
- Most PA, NP, and CNM providers do not own their practice;
- CNMs identified reimbursement rates as a reason to stop practicing in the next ten years;
- The majority of PAs, NPs, and CNMs practicing in Arizona were recruited from other states;
- Only 50 to 60% of the PAs and NPs trained in Arizona practice in Arizona;
- There are numerous opportunities to address workforce shortages and improve access to high quality, cost efficient health care in Arizona's rural and urban underserved areas and populations.

1. Introduction

As the Patient Protection and Affordable Care Act (ACA) coverage provisions – Health Insurance Marketplace (Marketplace), and Medicaid expansion – are progressing, demand for health care is growing. ***The Supply of Physician Assistants, Nurse Practitioners, and Certified Nurse Midwives in Arizona*** estimates the supply of PAs, NPs, and CNMs as crucial components of the state's health provider capacity. The study used licensing board data, training and graduation numbers from PA and NP colleges, and interviews with providers. The study calculates Arizona's provider to population ratio, compares it to the national average, reports the number of PA, NP, and CNM providers attending Arizona schools by specialty and primary care, and estimates the number needed in Arizona to meet national benchmarks.

There are 100,388 PAs in the United States (US)[1] and 2,039 (2.0%) in Arizona[2]; 180,233 US NPs[3] and 3,068 (1.7%) in Arizona[4]; and 12,383 US CNMs[5] and 182 (1.5%) in Arizona.[4] Graduate level education is required for each.

Primary care is a cornerstone of public and population health. Strengthening primary care as more are covered by the Marketplace and by Medicaid (AHCCCS[b]) can reduce health disparities, improve population health outcomes, and increase preventive services such as cancer screening. Yet, the primary care workforce is insufficient to meet national needs.[6] For example, many health professions students

[b] Arizona Health Care Cost Containment System is Arizona's Medicaid agency, http://www.azahcccs.gov/.

choose to work in adequately served urban areas and to subspecialize to earn higher compensation. This creates shortages of providers in inner city urban, poor and rural populations.[7]

1.1 Scope of Practice, Training Standards, Liability Insurance, and Reimbursement for Health Services

As more are covered by AHCCCS and the Marketplace, public and private sectors must respond to increased demand for health services. In Arizona, many areas are federally designated as Health Professional Shortage Areas (HPSA)[c] for primary care, dental and behavioral health. Assuring a well-trained and distributed health workforce requires timely data, analysis and interventions to address shortages. The health professions training pipeline can be long, costly and inefficient in distributing graduates to areas of need especially for physicians.[d] PAs, NPs, and CNMs practicing to the full extent of their education and training can help assure access to high quality, cost efficient care.

Obstacles to health professions supply and distribution to areas and populations in need include state scope-of-practice laws,[8] institutional credentialing and privileging processes, liability insurance costs and other factors that restrict practice. Intense professional 'turf battles' revolve around supervision, quality of care, safety, education subsidies, preceptor ('field faculty') credentials at community based training sites, and payment for services. Many states allow independent practice, and address liability costs through insurance risk pools and other strategies.[9, 10]

Health practitioners are licensed, certified and otherwise regulated by boards, with state specific scope-of-practice laws and regulations. Scope-of-practice includes legislation and licensing regulations on provider procedures, practice, actions, that are permitted or prohibited, and overseen by state licensing boards, for individual providers.[11, 12, 13, 14, 15] Each state defines the scope-of-practice for health care professionals licensed by the state.

Physician assistants perform physical examinations, diagnose and treat illness, order and interpret lab tests, do procedures, assist in surgery, provide patient education and counseling and make rounds in hospitals and nursing homes.[16] They provide services under the supervision of a licensed physician. Arizona PA regulations do not require supervising physician presence when a PA provides care, but stipulate weekly meetings in person or by phone.[14] PAs practice and prescribe medication in all 50 states.[16] Median PA compensation is $91,000/yr.[17] Insurance reimbursement for PA services is generally 85% of physician payment.[18]

Nurse practitioners provide a wide range of health services. They "take health histories and provide complete physical exams; diagnose and treat acute and chronic illnesses; provide immunizations; prescribe and manage medications and other therapies; order and interpret lab tests and x-rays; and provide health teaching and supportive counseling."[19] In Arizona, NPs can perform health care facility

[c] HPSA http://hpsafind.hrsa.gov/

[d] Primary care physicians include family medicine, general pediatrics, general internal medicine and some definitions include obstetrics/gynecology - require 3 to 4 years of residency, 4 years of medical (allopathic or osteopathic) school, and 4 years of undergraduate education.

admissions and discharges. Arizona is one of 18 states where NPs can practice without physician supervision.[20] Median NP compensation is $90,000/yr.[21] Medicare NP reimbursement is 85% of the physician rate.[22]

Certified nurse midwives[e] are licensed, independent providers with prescriptive authority in all 50 states.[23] They provide primary and prenatal care to women including gynecological exams and family planning, manage low-risk labor and delivery, and provide neonatal and newborn care.[19] Practice settings include hospitals, birthing centers, community clinics and patient homes.[19] In Arizona, CNMs are regulated by the State Board of Nursing (AzSBN) under the Nurse Practice Act. A CNM is allowed to care for low risk clients, and is required to inform the client, both orally and in writing, of the midwife's scope-of-practice prior to providing care.[13, 23] Median CNM compensation is $90,000/yr.[24] Medicaid CNM reimbursement is 90% of physician payment. CNM third-party reimbursement is mandated in Arizona. In 2007, Arizona CNMs delivered 5,389 babies and accounted for 5.2% of births.[11, 25]

Scope-of-practice limits procedures, actions, and care permitted to assure quality and safety. However, they can create market distortions that impair efficient care delivery and fair payment for services. For example, federally designated rural health clinics (RHCs)[f] are exempt from state scope-of-practice laws, receive special Medicare and Medicaid reimbursement, and NPs receive the same Medicare payment rate as primary care physicians.[20, 26, 27, 28] In other practice sites in Arizona, NPs and CNMs are paid 90% of AHCCCS/Medicaid physician payment. Addressing PA, NP and CNM scope-of-practice and reimbursement policies may expand primary care capacity in underserved rural and urban areas.[11]

Organizations can maximize the efficient output of workforce services through the use of economic production functions[29] and manage their workforce accordingly. Hospitals and practice sites verify licensing and board certification, approve and credential providers to practice in inpatient and outpatient settings, and can restrict or expand provider scope-of-practice in their facilities. Thus, scope-of-practice varies widely between states and within institutions. Scope-of-practice can be expanded though formal degree programs, board certification, supervision (ex. PAs), and through employment in supportive systems such as CNMs in New Mexico (See page 12, Comparison to Other States).

1.2 Rural Urban Commuting Area

There are significant demographic, economic, and infrastructural differences between urban and rural areas. For example, rural areas have fewer health resources available, average incomes are lower, risks from traumatic injuries are higher, and male suicide rates are higher.[30] Federal and state governments and agencies implement laws, regulations and policies that can mitigate or exacerbate the root causes of the health disparities between rural and urban, racial, ethnic and socioeconomic populations.

The Supply of Physician Assistants, Nurse Practitioners, and Certified Nurse Midwives in Arizona stratified the state health workforce by urban and rural areas to improve the power of the analysis and

[e] CNMs are not the same as Licensed Midwives who are licensed by AzDHS http://www.azdhs.gov/als/midwife/

[f] RHCs are federally qualified health clinics located in medically underserved areas. http://www.hrsa.gov/healthit/toolbox/RuralHealthITtoolbox/Introduction/ruralclinics.html

the quality of the results. There is no single, universally preferred definition of rural. Useful definitions of rural include:

- Rural-urban commuting areas (RUCAs) - define degrees of rural and urban by their proximity to urban areas and the portion of the populations that commute from rural to urban areas.[31] This is the rural classification system used in this report.
- The U.S. Census Bureau - bases rurality on a combination of population density, relationship with cities, and population size.
- The Office of Management and Budget (OMB) - classifies counties on the basis of their population size and integration with large cities.
- The U.S. Department of Agriculture - bases rurality on typology that identifies groups of U.S. non-metropolitan counties sharing important economic and policy traits.
- The Department of Health and Human Services (HHS) Administration on Aging - uses the Census Bureau urbanized area definition and postal zip code boundaries to classify urban or rural zip codes.
- The State of Arizona - defines rural as (1) a county with a population < 400,000 persons according to the most recent US decennial (every 10 years) census, and (2) a census county division with < 50,000 persons in a county with a population of 400,000 or more persons from the most recent census.[g]

The rural-urban commuting areas (RUCAs) classification system was established by the University of Washington's Rural Health Research Center. Map 1 illustrates RUCAs. Map 2 shows fine scale variability in Arizona's population density with respect to county[h] and zip code boundaries. These illustrate population coverage by providers and survey participation by profession (Maps A2.1-A2.6). See Appendix 1 for additional information on rural classifications used in this report.

Scoring for federal funding is based on the specific rural definition criteria used. For example, over 30 federal programs use the Health Professional Shortage Areas, Medically Underserved Areas, and Medically Underserved Populations (HPSA, MUA/P) scoring criteria. Scoring also affects funding for communities to receive National Health Service Corp (NHSC) loan repayment to attract providers to practice in rural areas, the Conrad 30 J-1 Visa Program that supports physicians to practice in underserved areas, telehealth, RHCs, Community Health Center funding, enhanced Medicare/Medicaid payment, Area Health Education Center funding and other programs intended to improve rural health. See Section 1.3.

The HHS's Health Resources and Services Administration (HRSA) defines *frontier* areas for federal funding purposes as "sparsely populated rural areas that are isolated from population centers and services."[i]

1.3 Funding the Rural Health Infrastructure

Rural health funding includes grants, tax and assessment subsidies, tax exemptions, and other sources.

[g] A.R.S. 36-2171. (2004) http://www.azleg.gov/arizonarevisedstatutes.asp?Title=36.
[h] Arizona has 15 very large counties compared to states with many small counties. For example, Pima County, at 9,186 sq. miles, population 992,394 is the size of Vermont (9,614 sq. miles, pop. 626,011 and 14 counties).
[i] What it the definition of frontier? http://www.raconline.org/topics/frontier/faqs/

Examples of funding supporting rural health infrastructure and services include:

1) ***Grants*** include private foundations, federal, state and other funding. Grant programs that support rural health include:

- Area Health Education Center Program – **AzAHEC** partners with five regional centers[j] focused on developing integrated, sustainable statewide health professions workforce education programs with emphasis on primary care and increasing access in Arizona's rural and underserved communities.
- Medicare Rural Hospital Flexibility Program (**Flex**) - improves access to and assures the fiscal viability of America's smallest and most vulnerable rural hospitals. Arizona's Flex Program includes 15 critical access hospitals (CAHs) and assists with quality and performance improvement, integrates emergency medical services within the health system, and stabilizes rural hospital finances;
- Small Rural Hospital Improvement Program (**SHIP**) - supports quality improvement and reporting, meaningful use of health information technology, implementation the prospective payment system and the Health Insurance Portability and Accountability Act (HIPAA).
- State Offices of Rural Health Program – is a focal point for rural health issues in each state. **AzSORH**[k] is housed in the UA Center for Rural Health. The **CRH** includes Arizona's Flex[l] and SHIP[m] Programs.

2) ***Tax and Assessment Subsidies***

- State subsidies to support rural health are generated by revenues from assessments and/or taxes on income, gross receipts, property, hospital, business, tobacco, alcohol, sugared beverages, fast foods, and others. Arizona examples include the Rural Hospital Inpatient Fund Payments, a $2 per pack excise tax on cigarettes that supports AHCCCS (Arizona's Medicaid program) and smoking cessation services; state general fund dollars that support critical access hospitals through AHCCCS supplemental payments for uncompensated care (CAH pool); and an assessment on hospitals that helps the state pay its share of restoring AHCCCS eligibility to 100% of the Federal Poverty Level (FPL) for childless adults. Tobacco settlement dollars are used to pay a portion of the state share of costs related to the expansion of Medicaid to 100% FPL that occurred by voter mandate in 2000. Provider (hospital) assessments cover the costs of that expansion, and restoration in 2013, not covered by tobacco settlement dollars.
- State-Federal Programs - states levy taxes and assessments to help pay the state's share of Medicaid costs. States changing provider payment methodology must submit a state plan amendment (SPA) to the Centers for Medicare and Medicaid Services (CMS). CMS makes sure that such payments "are consistent with efficiency, economy and quality of care and are sufficient to enlist enough providers so that the care and services are available under the plan at least to the extent that such care and services are available to the general population in the geographic area."[n]
- Medicare and Medicaid graduate medical education (GME) direct (DGME) and indirect (IME) payments to teaching hospitals support resident training. Medicare and Medicaid pay $13 billion per year to teaching hospitals. Forty states participate in Medicaid direct and/or indirect GME with

[j] AzAHEC at: http://azahec.ahsc.arizona.edu/
[k] AzSORH http://crh.arizona.edu/programs/sorh
[l] Az Flex http://crh.arizona.edu/programs/flex
[m] Az SHIP http://crh.arizona.edu/programs/ship
[n] Medicaid Financing and Reimbursement: http://www.medicaid.gov/Medicaid-CHIP-Program-Information/By-Topics/Financing-and-Reimbursement/Financing-and-Reimbursement.html

$3.8 billion/year paid to teaching hospitals. Arizona eliminated its general fund support of Medicaid GME, but allows teaching hospitals to pay the state share of Medicaid GME expense.

- Teaching health centers (THC) support increasing the number of primary care residents and dentists trained in ambulatory patient care settings, but funding must be reauthorized in 2016. Example: if Arizona restored Medicaid GME funding, submitted a state plan amendment to CMS to request that qualified teaching hospitals, and the new THC in Flagstaff, AHCCCS GME could be used to finance and help move the health professions training pipeline, including contemporary interprofessional team based training and care delivery, into areas of need.
- Other rural health federal subsidies – include disproportionate share hospital (DSH) Medicare and Medicaid payments, community health center funding, and National Health Service Corps scholarships and loan repayment to attract health providers to practice in rural areas.

3) ***Tax exemptions*** – nonprofit hospitals and other health delivery entities often receive city, county, state and federal tax exemptions and discounts in exchange for demonstrating community benefit such as charity care. ACA Section 9007 expands and standardizes financial assistance policies, requires a community health needs assessment every three years, and standardizes hospital charges, billing and collection practices. All tax exempt organizations must submit an IRS Form 990 Schedule H, "Charity Care and Certain Other Community Benefits at Costs" detailing a hospital's unreimbursed costs for: means tested government programs including Medicaid, health professions education, community benefit operations and improvement services, and subsidized health services.

1.4 Current Workforce

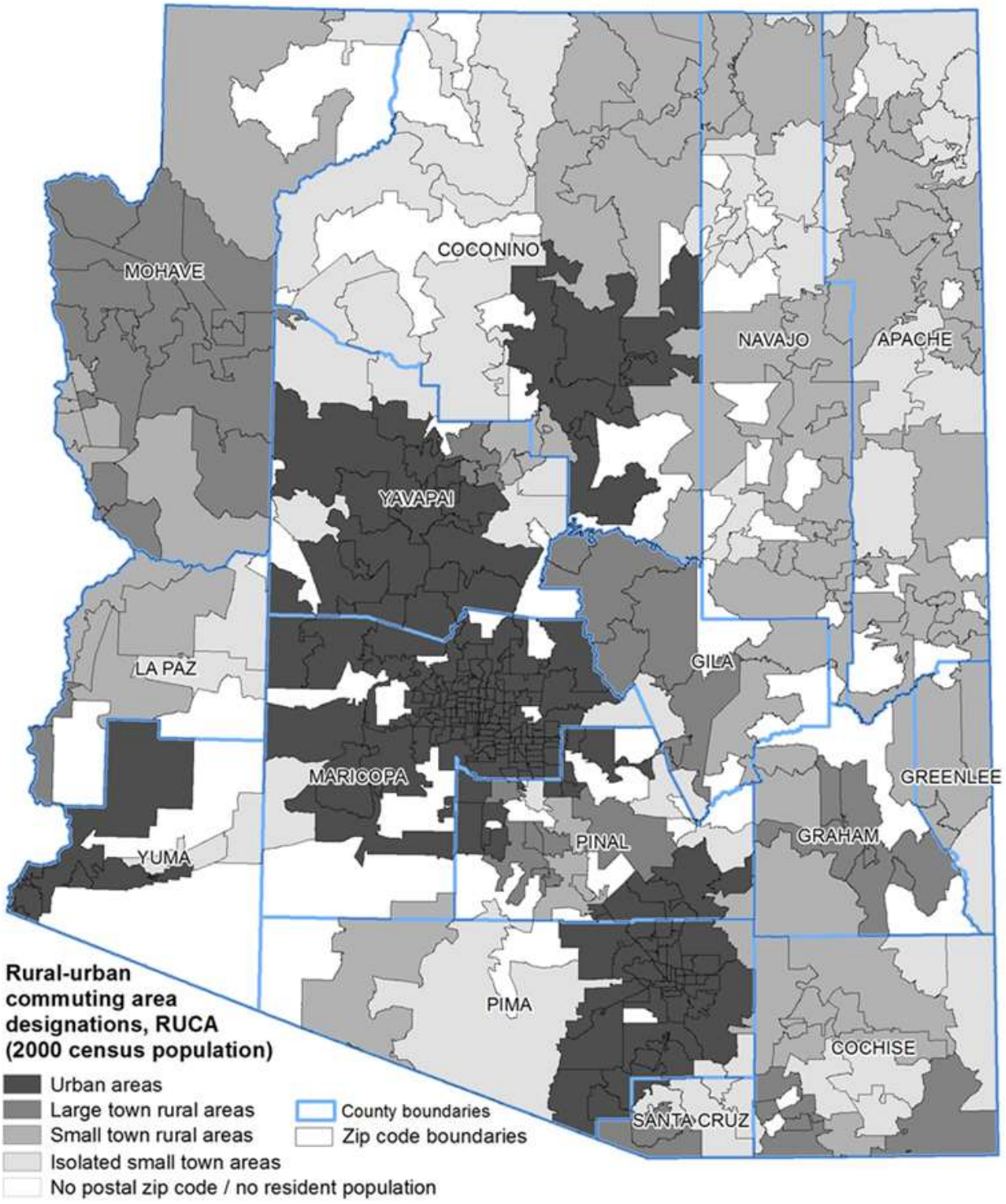
The aging US population coupled with ACA coverage expansion contribute to health workforce shortages. By 2030, 78 million baby boomers will reach or exceed age 65.[32] ACA is projected to cover 26-32 million uninsured over the next 10 years.[33] The health workforce is aging. Over 40% of NPs are over 50, many will retire in the next 10 to 15 years.[34] How will retirements from an aging workforce affect rural areas?[35]

The national forecast is for significant primary care physician shortages[36, 37] even with PA supply increases.[38] Arizona's population will increase by 2.3 million (35%) by 2030[39] and increase the demand on the health care system. Will NPs, PAs and CNMs fill the gap, especially in rural areas?[36, 40, 41]

Arizona Current State Profile

As of 2013, there are 2,005 PAs, 3,068 NPs and 182 CNMs with an active license and practice address in Arizona. The majority reside in urban areas including Phoenix and Tucson (Table 1). Per capita NPs are higher in urban than rural areas, while PAs are nearly equally distributed and CNMs are higher for rural areas (3.43 per 100,000) than urban areas (2.74 per 100,000) (Table 2). PA and NP per capita supply is low in rural Arizona compared to the US. Arizona's rural CNM supply is above the national average.

Map 1. Location of rural-urban commuting areas (RUCA v2) based on postal zip code geography and Census 2000 data.



Map 2. Population density in Arizona based on Census 2010 block data.

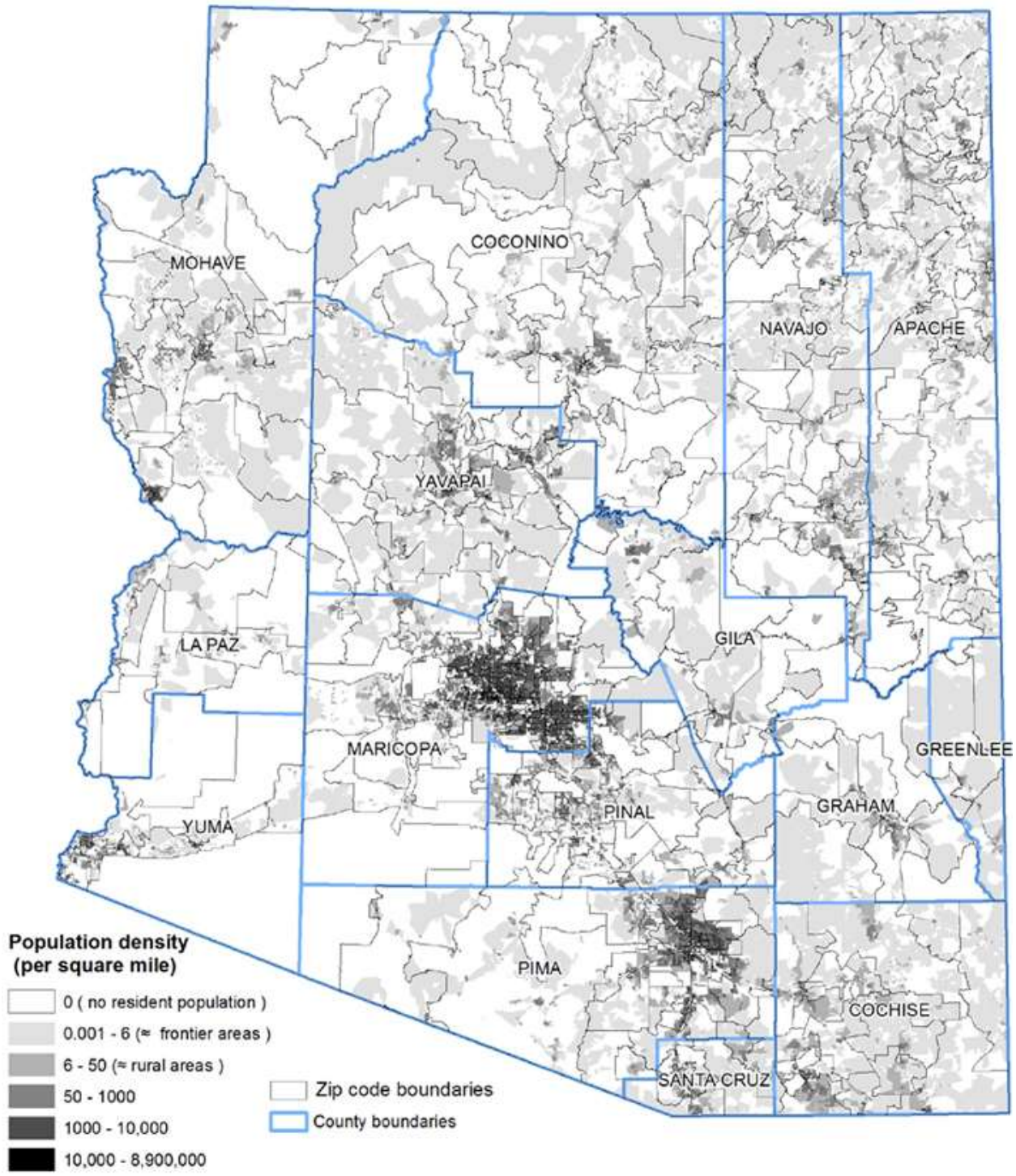


Table 1. Number of PA, NP, and CNM providers in Arizona by RUCA classification 2013[2, 4]

Rural Urban Commuting Area Classification	Population (Census 2010)	# of Licensed Physician Assistants[o]	# of Licensed Nurse Practitioners	# of Licensed Certified Nurse Midwives
Urban	5,430,946	1,751	2,781	149
Large Rural Town	474,811	138	150	7
Small Rural Town	378,765	95	111	24
Isolated Small Rural Town	107,226	21	26	2
Total	6,391,448	2,005	3,068	182

Table 2. Coverage of PA, NP, and CNM providers in Arizona per 100,000 population.[2, 4, 42]

Rural Urban Commuting Area Classification	Population Coverage Per 100,000 (Census 2010)		
	Physician Assistants	Nurse Practitioners	Certified Nurse Midwives
Urban	32.2	51.2	2.7
Large Rural Town	29.1	31.6	1.5
Small Rural Town	25.1	29.3	6.3
Isolated Small Rural Town	19.6	24.3	1. 96
United States Average	27.0	58.0	2.9

Age distribution of PA, NP, and CNM Providers

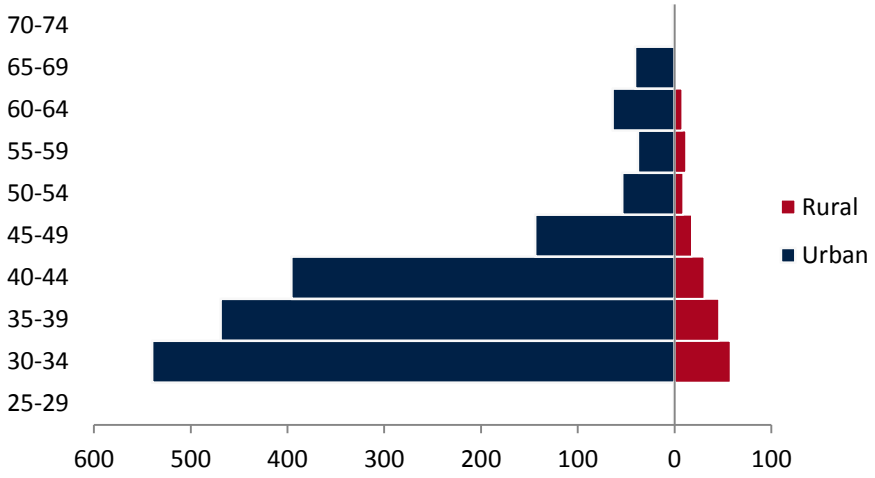
Age is included in Arizona State Board of Nursing's NP and CNM data, but not in Arizona Regulatory Board of Physician Assistants' data. PA age was estimated from graduation dates. For PAs with missing graduation dates, the age was imputed using the average age of all the PAs in the licensure data. PA age estimates were consistent with the Arizona State Association of Physician Assistants' (ASAPA) 2012 survey data, where 46% were < 40 years old. The majority of PA respondents were either from Generation X (1965-1979) or the Millennial Generation (1980-2000).[43]

Physician Assistant Age Distribution

The majority (52%) of Arizona PAs is under age 40; the age distribution is similar for urban and rural areas (Figure 1). Retirement of the PA workforce in the next 10 years is less of a factor than for NPs.

[o] Data in table based on June 2013 PA data. December 2013 total was 2039 licensed PAs that reside in Arizona.

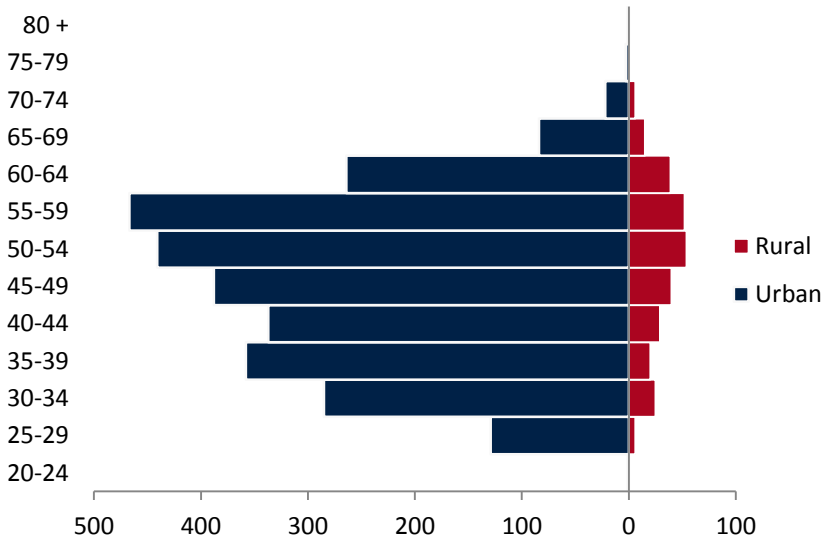
Figure 1. Number of active licensed physician assistants by age grouping for urban and rural areas.



Nurse Practitioner Age Distribution

Many Arizona NPs are nearing retirement age. About 31% of the actively licensed nurse practitioners are over age 55 (Figure 2). Some may have deferred retirement due to the recession and may retire as soon as the economy recovers. The NP age distribution is similar for urban and rural areas.

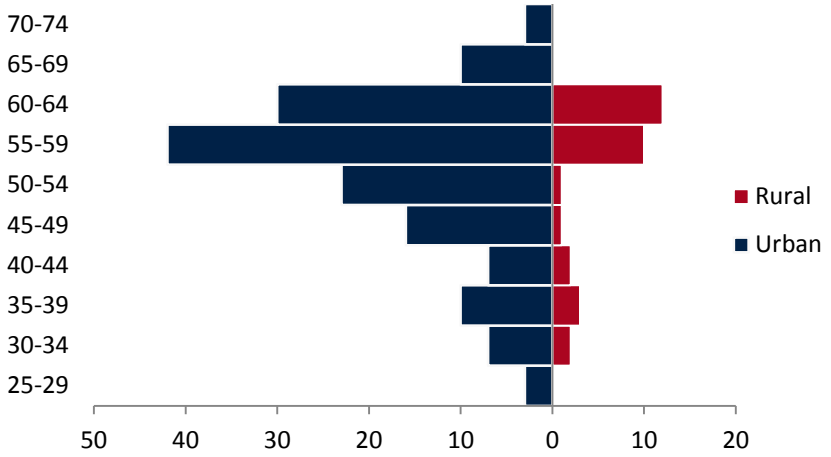
Figure 2. Number of active licensed nurse practitioners by age grouping for urban and rural areas.



Certified Nurse Midwives Age Distribution

The number of Arizona CNMs is small. Only 24 (13%) of the CNMs are under the age of 40. About 46% of urban CNMs and 70% of the rural CNMs are over age 55, may retire in the next 10 years, and reduce providers caring for pregnant women, especially in rural Arizona (Figure 3).

Figure 3. Number of active licensed certified nurse midwives by age grouping for urban and rural areas.



Comparison to Other States

Many states face health workforce shortages (Table 3). For example, New Mexico estimated that the current 1,327 advanced practice registered nurses (APRNs)[p] are 285 short for serving its 2.1 million residents.[44] New Mexico has 63.2 APRNs (57 NPs) per 100,000 population and needs 76.8 per 100,000. Arizona has 56.3 APRNs (45 NPs) per 100,000 population - less than New Mexico.[4, 42, 44, 45]

New Mexico's CNMs combine high quality care at lower cost,[44] ranking 2nd nationally in per capita CNMs, and 1st in attended births (Table 3). Its infant mortality rate (5.7 per 1000 live births) is the 13th lowest nationally even though it has the 3rd highest poverty and teen pregnancy rates (48.8 births per 1000). CNMs delivered babies in 23 of New Mexico's 33 counties with the majority in Albuquerque and Las Cruces hospitals.[46, 47, 48] The low mortality rates are attributed to ready access to CNMs, socio-demographics factors,[49, 50] team-based medical care, and in-house back up by obstetricians, neonatologists, and perinatologists.

Washington (population 6.7 million) has health workforce shortages with 3,811 licensed NPs (56.5 per 100,000), 2,621 licensed PAs (38.9 per 100,000), and 258 CNMs (3.8 per 100,000).[45, 46, 51] In 2012 the Washington Health Care Personnel Shortage Task Force identified gaps between supply and demand for both nurses and PAs.[52] The state implemented policies to increase training program completion rates and increased PA graduates by 16%.[52]

Nevada has health workforce shortages.[53] It has 613 licensed PAs (23 per 100,000), 718 licensed NPs (26.0 per 100,000), and 23 CNMs (0.8 per 100,000).[46, 51, 54] Nevada ranks 34th for PAs, 47th for CNMs, and 51st for NPs. Much of Nevada is federally designated as a HPSA.[53] The shortages are magnified by an aging population, large rural areas, and a high percentage of uninsured expected to gain coverage.[53]

[p] Advance practice registered nurses include NPs, CNMs, certified registered nurse anesthetists, and clinical nurse specialists.

Arizona faces similar challenges. It has 947,878 of its 1.2 million uninsured eligible for Marketplace or Medicaid coverage.[55] Arizona has over 2 million (31%) over age 50.[42] Those >50 are higher users and thus more costly.[56] These factors increase demand on the state's health workforce, especially for primary care and direct care workers[q] that are needed in nursing homes, long-term-care facilities, hospice agencies, and homes.[57]

Table 3. State rankings for the number of practicing PA, NP, and CNM providers per population and number of CNM attended births per total births[46, 51, 54]

State	PA	NP	CNM	
	per population			per births
AL	49	47	51	3 (19%)
AK	1	4	1	2 (20.8%)
AZ	28	30	20	32 (5.2%)
AR	48	6	49	51 (0.6%)
CA	41	42	31	23 (7.6%)
CO	6	25	6	22 (7.8%)
CT	9	5	5	15 (9.7%)
DE	26	13	26	41 (4.3%)
DC	3	1	9	40 (4.3%)
FL	34	19	15	12 (10.7%)
GA	33	38	13	8 (14.7%)
HI	43	23	27	42 (4.3%)
ID	13	45	41	43 (4.3%)
IL	38	49	33	29 (5.9%)
IN	46	40	44	34 (5.2%)
IA	27	44	29	30 (5.4%)
KS	21	15	34	39 (4.5%)
KY	36	18	32	37 (4.8%)
LA	44	36	50	50 (1.4%)
ME	5	9	11	7 (15.1%)
MD	18	27	17	28 (6.7%)
MA	23	3	4	10 (13.4%)
MI	17	43	25	31 (5.3%)
MN	12	35	14	18 (9.1%)
MS	50	8	47	49 (2.0%)
MO	47	20	39	47 (3.1%)
MT	4	33	22	16 (9.7%)
NE	7	34	46	35 (5.1%)
NV	35	51	48	44 (4.2%)
NH	10	2	7	5 (15.4%)
NJ	45	26	19	20 (8.2%)
NM	30	31	2	1 (33.3%)
NY	19	10	10	14 (10%)
NC	11	46	36	13 (10.7%)
ND	14	17	43	45 (4.0%)
OH	42	41	28	27 (7.1%)
OK	29	50	45	46 (3.3%)
OR	22	21	8	6 (15.3%)
PA	20	28	30	17 (9.6%)
RI	32	22	12	11 (12.9%)
SC	40	14	37	36 (4.9%)
SD	2	29	24	26 (7.1%)
TN	39	7	38	33 (5.2%)
TX	37	48	42	48 (2.6%)
UT	24	37	21	21 (8.1%)
VT	8	12	3	4 (18.3%)
VA	NA	11	23	38 (4.5%)
WA	31	32	16	19 (9.1%)
WV	15	39	18	9 (13.9%)
WI	25	24	35	25 (7.4%)
WY	16	16	40	24 (7.5%)

Rankings are based on # of providers per 100,000 population, and # of CNM attended births per # total births (%)

[q] "Nurse aides, home health aides, and personal and home care aides -- are the primary providers of paid hands-on care for more than 13 million elderly and disabled Americans. They assist individuals with a broad range of support including preparing meals, helping with medications, bathing, dressing, getting about (mobility), and getting to planned activities on a daily basis."[57]

2. PA, NP, and CNM Provider Surveys

Three web-based health workforce survey instruments were developed and administered to amplify Arizona licensing board data. Questions included demographics, practice status, educational attainment, future practice plans, and factors influencing practice location. Response rates were 9.7% for PAs, 11.3% for NPs and 23.0% for CNMs. Refer to Appendix 1 for Methodology details.

2.1 Respondent Demographics

Ethnicity

The majority (86%) of PA, NP, and CNM provider survey respondents self-identified as White - 95% of CNMs and 86% of NPs and PAs (Table 4). This reflects the makeup of the overall population from 2010 Census data, where 84% of Arizonans reported being White.[42] The results also correlate with the 2012 ASAPA survey that reported 86.9% of PA respondents were White.[43]

Table 4. PA, NP, and CNM survey response by provider type and ethnicity.

Ethnicity	CNM	NP	PA
American Indian or Alaskan Native	1	1	7
Asian / Pacific Islander	0	8	12
Black or African American	0	4	7
Hispanic	0	15	24
Other	1	20	34
White / Caucasian	40	298	499
Total	42	346	583

Age

The age distribution of survey participants by urban and rural practice locations (Figures 4-6) correlated well with the data obtained from the Arizona license boards for PAs, NPs, and CNMs (Figures 1-3). The survey did not show selection bias due to age.

Many of the survey respondents are nearing retirement age. Over 37% of respondents reported being age 55 or older. Retirement will affect the CNM workforce quickly as 54% of CNM respondents reported being over age 55, followed by NPs (41%) and PAs (27%). Retirement and reduction of direct patient care effort decrease capacity. Current and near term public and private sector policies and the economy will impact near term provider practice decisions, and in turn affect rural access to health care.

Gender

A high proportion of the respondents were female (Table 5). Survey results correlate well with the state licensing board data. Over 90% of NP survey respondents and state board data licensees are female. For PAs, gender is not reported in the license data. PA survey respondents were 60% female and 40% male. These results are similar to the 2012 ASAPA survey that reported 57.5% female respondents and 42.5% male respondents.

Figure 4. Count of physician assistant respondents in urban and rural areas by age group.

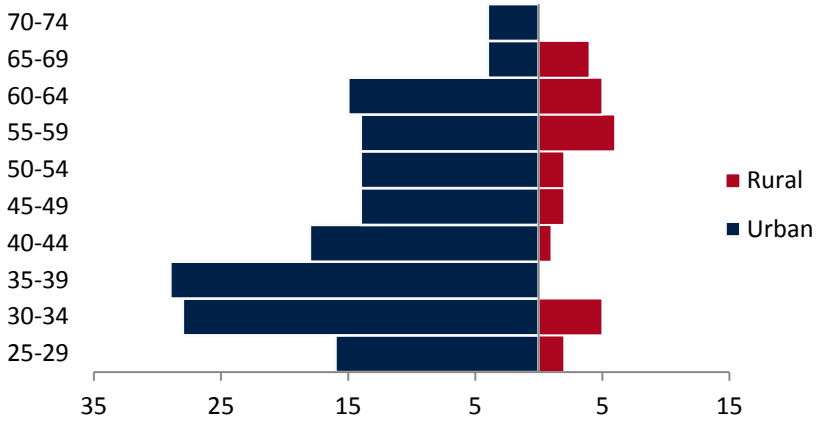


Figure 5. Count of nurse practitioner respondents in urban and rural areas by age groups.

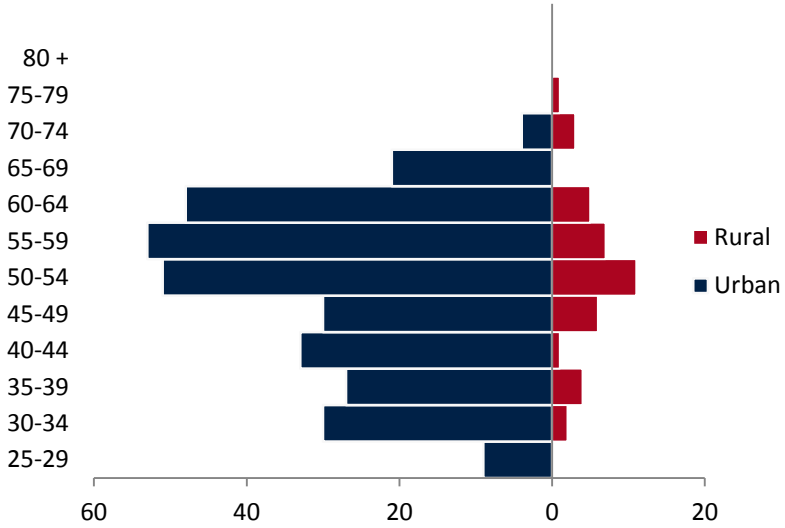


Figure 6. Count of certified nurse midwife respondents in urban and rural areas by age groups.

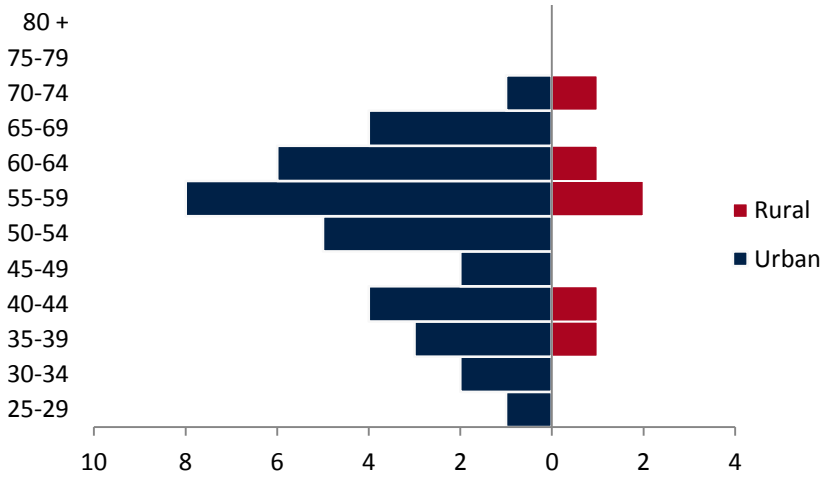


Table 5. Comparison of gender distribution of survey respondents to license data.[2, 4, 43]

	CNM Survey	CNM License Board Data	NP Survey	NP License Board Data	PA Survey	ASAPA 2012 Survey
Male	0	1	35 (10%)	285(9.2%)	78 (40%)	135 (42.5%)
Female	42 (100%)	181(99.9%)	311 (90%)	2,783(90.7%)	117 (60%)	183 (57.5%)
Total	42	182	346	3,068	195	318

2.2 Educational Attainment

The majority of PA, NP, and CNM providers responding to the workforce surveys had advanced training and education beyond a bachelor's degree: 76% of PA respondents, 96% of NPs, and 74% of CNMs had at least a master's degree. Many older PAs began practice with bachelor's degrees, and is reflected in the large number of PA respondents selecting "Other" (Table 6).

Table 6. Respondent's highest level of educational attainment.

	Nursing Diploma	AS in Nursing	BS in Nursing	MS in Nursing	MN	MS in PA Studies	MMS	PhD	EdD	DNP	ND	DHSC	Other	Not Answered	Total
CNM	1	3	0	26	3								7	2	42
NP		4	9	245	31			18	1	21	1			16	346
PA	1	4	1			78	33	1				3	40	34	195

AS -Associate of Science, BS - Bachelor of Science, MS - Master of Science, MN - Master of Nursing, MMS - Master of Medical Science, DNP - Doctorate of Nursing Practice, DHSC - Doctorate of Health Science

Many PA, NP, and CNM providers who received their degree in Arizona are choosing to practice in the state (Table 7): 50% of PA respondents, 59% of NP respondents, and 71% of CNM respondents reported receiving degrees in Arizona. This correlates with state license data (Figure 18). PA data are consistent with the ASAPA study[43] (48%) and Arizona Regulatory Board of Physician Assistants (47%) data.

Table 7. Proportion of Licensed Providers Receiving Professional Degrees in Arizona.

Profession	# of survey respondents	Received degree in Arizona	Survey estimate	Licensing board data
CNM	42	30	71%	N/A
NP	346	205	59%	N/A
PA	195	98	50%	47%
Total	583	333	57%	

2.3 Current Employment

Work Hours at Primary Practice Site

Rural PAs, NPs and CNMs spend more time each week at their primary practice site than their urban counterparts (Figure 7), but much of this time is spent on non-patient care (Figures 7 and 8).

Figure 7. Average hours spent per week at primary practice site.

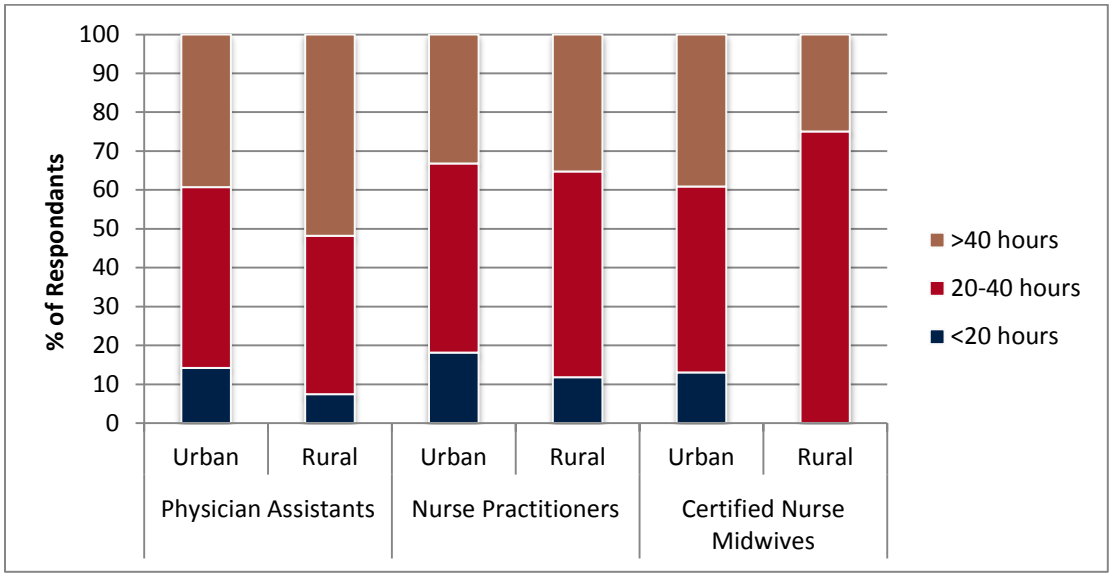
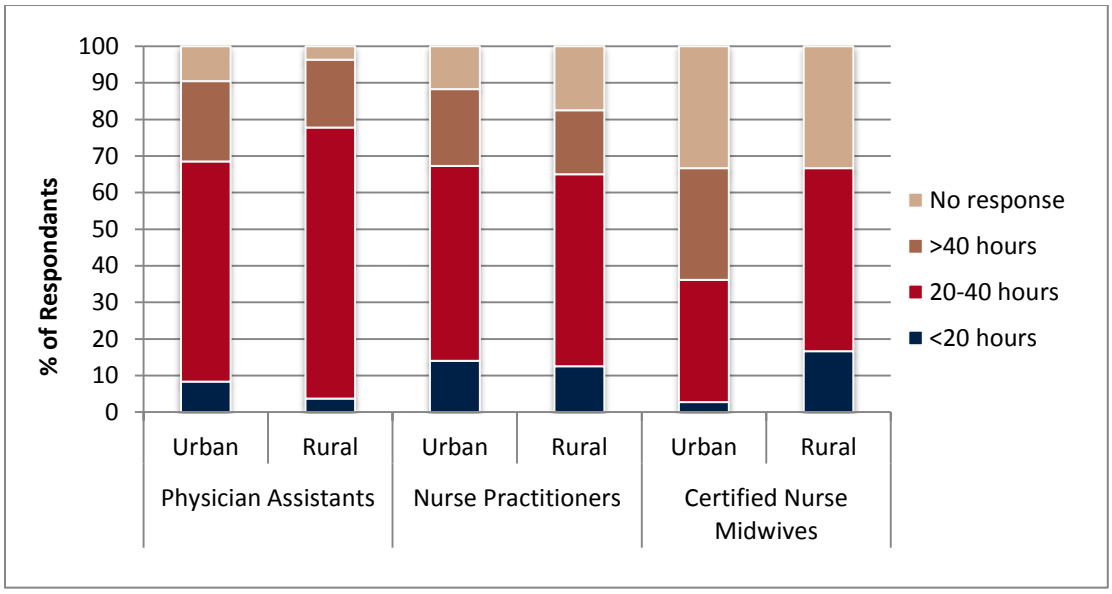
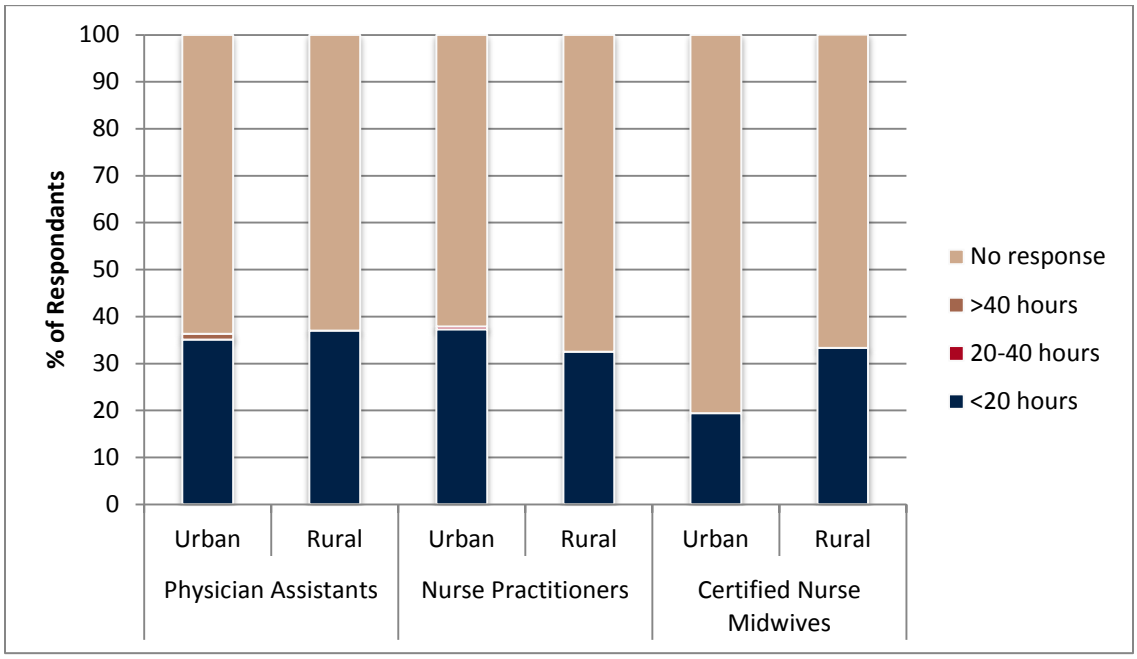


Figure 8. Average hours spent per week on direct patient care.



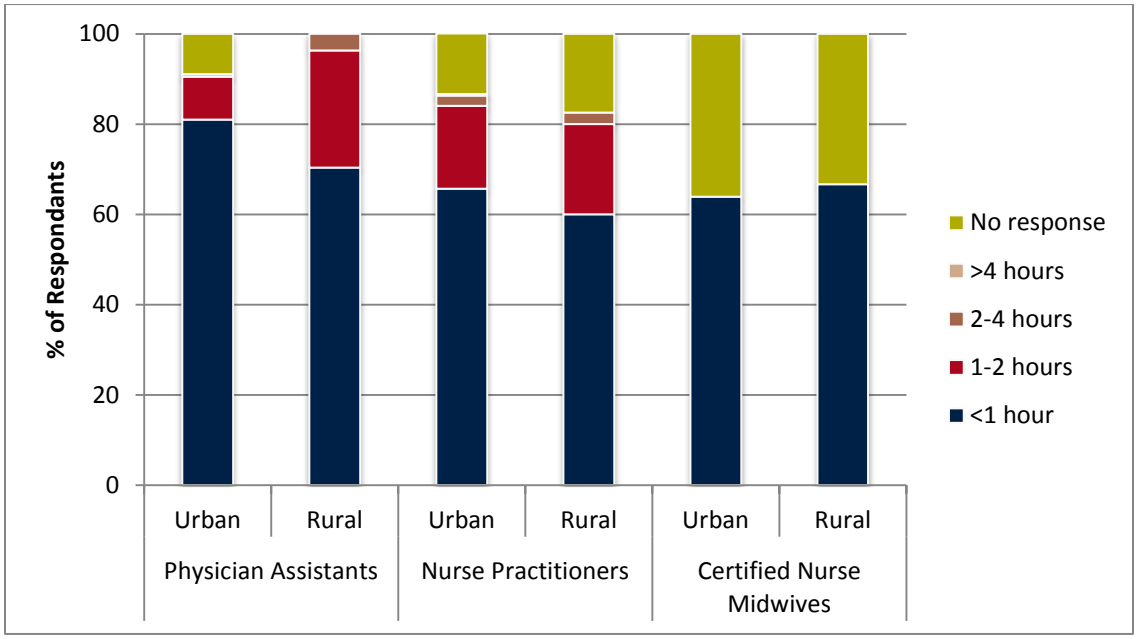
The average time spent on research for respondents is small (Figure 9). Overall, 64% did not respond to the question, while the most frequent response (29%) was less than five hours per week.

Figure 9. Average hours per week spent on research.



The majority of providers commuted less than one hour each day to their primary practice (69.8%) while less than 2% commuted more than 2 hours each day (Figure 10).

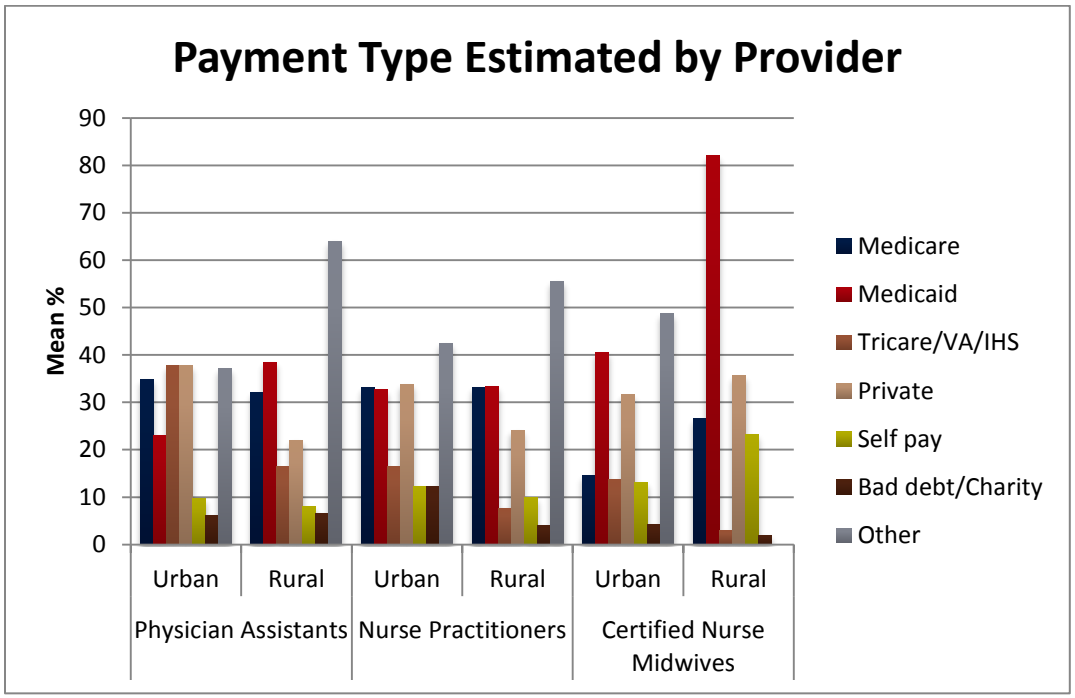
Figure 10. Provider round-trip commute times to primary practice.



Payer Mix in Provider Practices

Providers were asked to estimate the percentage of payers in their practice. These did not always add up to 100%. Some providers may not know the payer mix in their practice (Figure 11).

Figure 11. Provider estimates of payer mix percentages in their practice.



Future Practice Plans

The survey asked about plans to retire within 10 years, and by urban versus rural practice (Figures 2 and 12, and Table 8). Those with plans to retire within ten years (n=144) averaged 60 years old (range 36-74); in >10 years (n=215) age 44 (range 25-69); and with no plans to retire (n=153) age 43 (range 26-72). Those that did not respond (n=71) were on average 54 years old (range 30-76). All three professions have similar workforce losses to retirement. NPs will have the greatest and most immediate workforce losses (Figure 2). The relatively large proportion of rural PAs planning to retire (Figure 12) was likely due to disproportionate participation of older PAs practicing in rural areas (compare Figures 1 with 4).

Figure 12. Provider plans to retire.

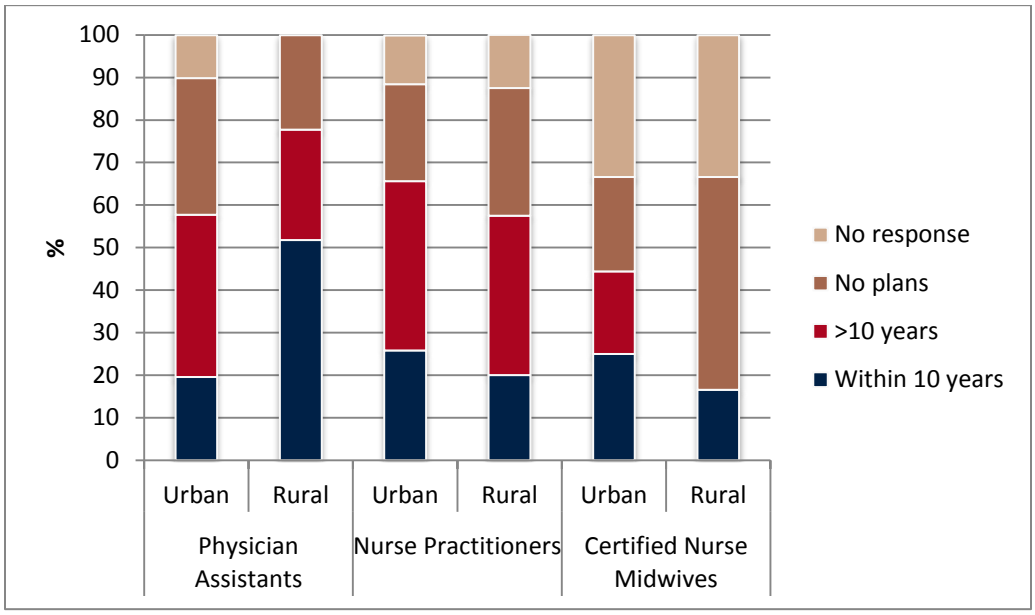


Table 8. Provider plans to retire within 10 years

	n	Average Age (years)	Std. Dev. (years)	Age Range
Physician Assistants				
Urban	33	60.0	8.2	36-74
Rural	14	59.8	6.9	43-68
Nurse Practitioners				
Urban	79	59.3	5.3	45-71
Rural	8	59.0	6.9	47-70
Certified Nurse Midwives				
Urban	9	61.0	2.7	57-66
Rural	1	59.0	.	59-59

The survey explored future plans to reduce work hours (Figure 13 and Table 9). Those with plans to significantly reduce practice hours within ten years (n=188) averaged 52 years old (range 25-73); in > 10 years (n=103) age 43 (range 28-62); with no plans to reduce hours (n=204) age 46 (range 26-72). Those that did not respond (n=88) were on average 56 years old (range 30-76).

Figure 13. Provider plans to reduce work hours.

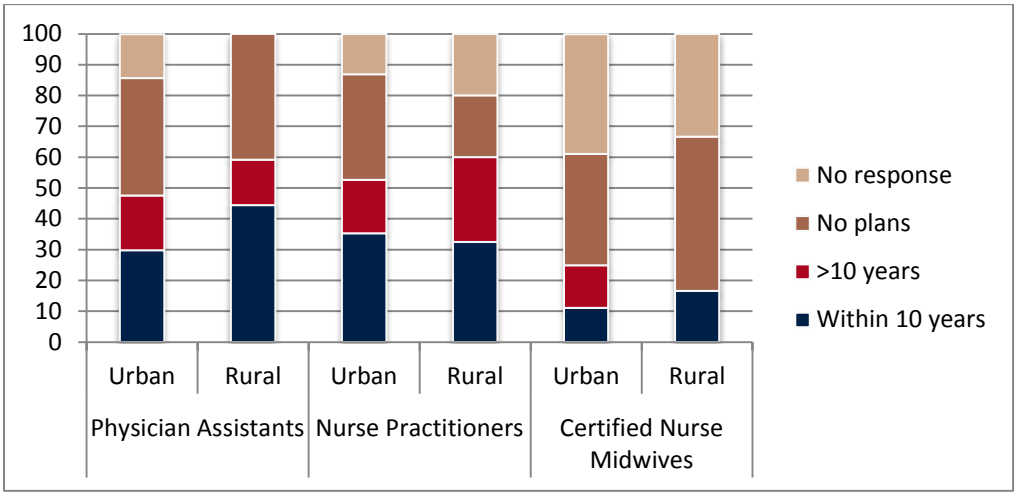


Table 9. Provider plans to reduce hours within 10 years.

	n	Average Age (years)	Std. Dev. (years)	Age Range
Physician Assistants				
Urban	50	46.3	13.7	25-73
Rural	12	56.0	10.0	34-68
Nurse Practitioners				
Urban	108	53.7	9.7	28-71
Rural	13	52.5	10.0	33-70
Certified Nurse Midwives				
Urban	4	59.0	6.1	51-66
Rural	1	59.0	.	59-59

Few providers plan to move their practice within or outside of Arizona (Figures 14 and 15).

Figure 14. Provider plans to move practice within Arizona.

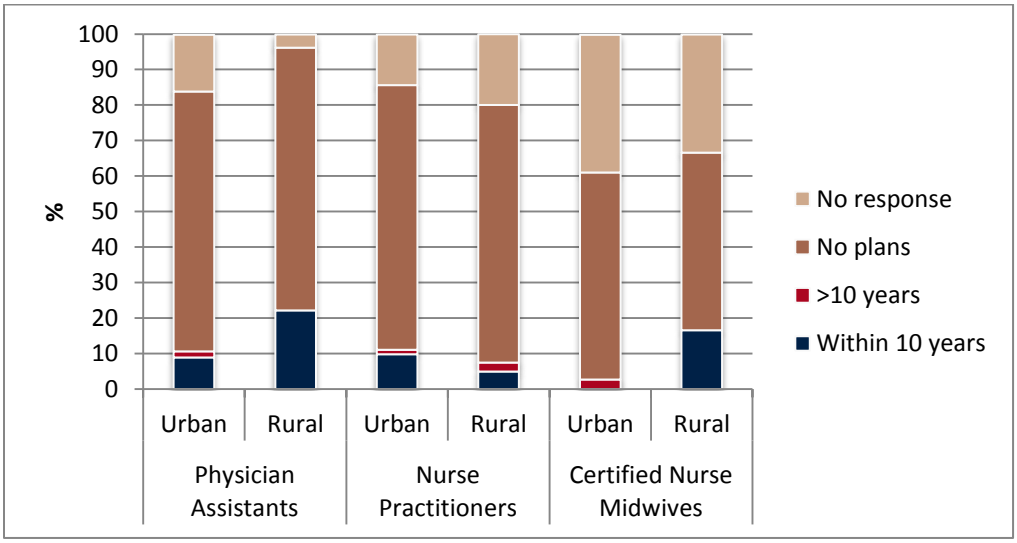
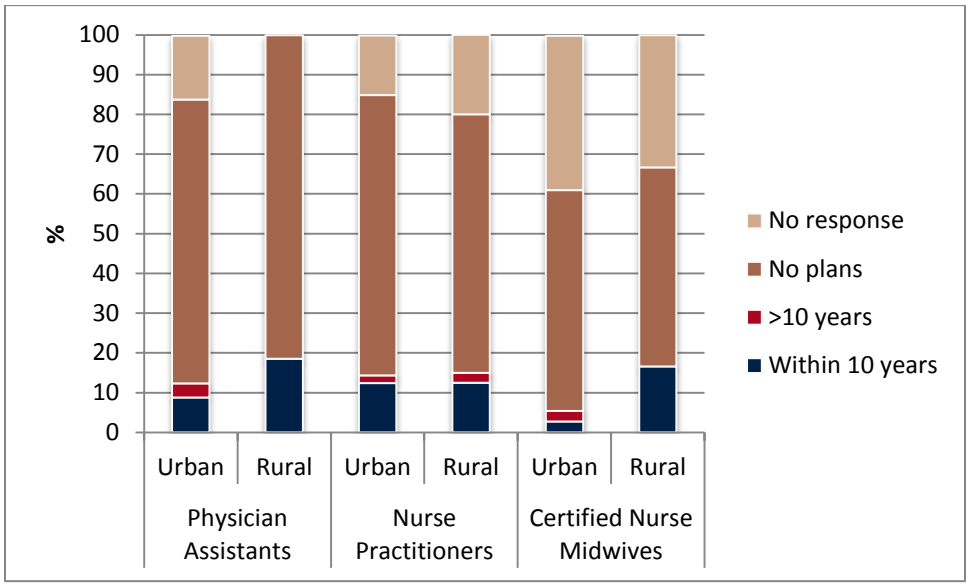
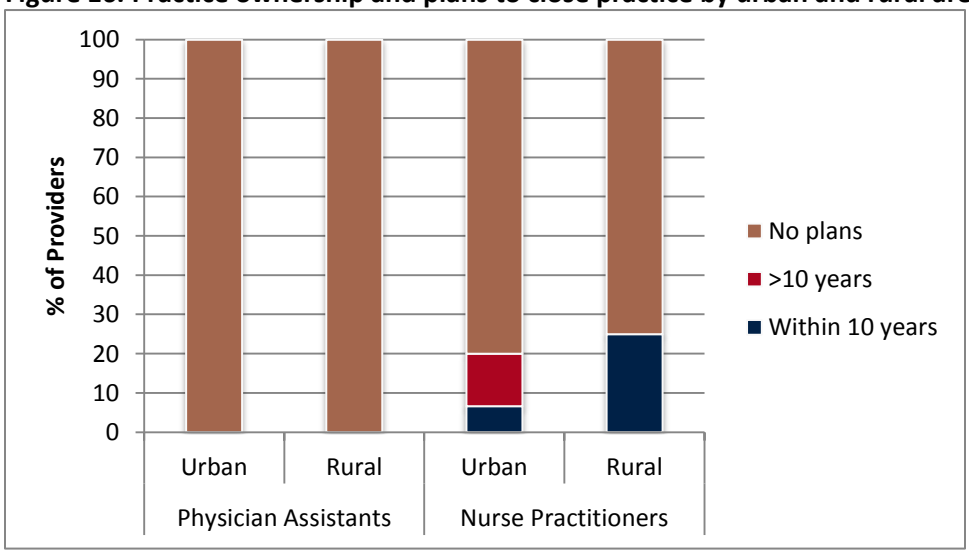


Figure 15. Provider plans to move practice outside of Arizona.



Few respondents that own their practice plan to close in the next 10 years (Figure 16). Only 6% of the nurse practitioners and 6% of the physician assistants have any practice ownership.

Figure 16. Practice ownership and plans to close practice by urban and rural areas.



Factors leading to Future Plans

The providers were asked "If you plan on retiring, significantly reducing patient hours, moving or closing your practice - rank from 1 to 6, with 1 being the most important and 6 being least important, the factors that led to this decision." The low PA, NP, and CNM overall response rate meant that most differences were not statistically significant (Tables 10-20). Analysis was possible for only large differences between comparison groups (See Appendix 1. See Appendix 2 for the summary of survey responses.)

Age

There were no statistical differences in age affecting work plans between urban and rural areas (Tables 10 and 11).

Table 10. Comparison of age affecting work plans between rural and urban areas.

	Urban			Rural			Difference
	n	Mean	95% CI	n	Mean	95%CI	p-value
PA	69	2.56	2.07, 3.05	23	2.60	1.75, 3.46	0.928
NP	148	2.64	2.35, 2.94	16	3.06	1.88, 4.23	0.472
CNM	12	1.75	0.80,2.69	2	4	-21.41, 29.41	0.436

Table 11. Comparison of age affecting work plans between urban and rural areas for those planning to reduce hours or retire within 10 years.

	Urban			Rural			Difference
	n	Mean	95% CI	n	Mean	95%CI	p-value
PA	17	1.41	0.86, 1.95	9	2	0.91, 3.08	0.292
NP	45	2.2	1.74, 2.65	5	2.2	-0.02, 4.42	1.000
CNM	4	1.25	0.45, 2.04	1	2	.	.

Lack of job satisfaction

There were no statistical differences in lack of job satisfaction affecting work plans between urban and rural areas for any provider (Tables 12 and 13).

Table 12. Comparison of lack of job satisfaction affecting work plans between rural and urban areas.

	Urban			Rural			Difference
	n	Mean	95% CI	n	Mean	95%CI	p-value
PA	64	3.31	2.91, 3.70	15	3.6	2.51, 4.68	0.602
NP	128	3.13	2.83, 3.43	16	3.56	2.53, 4.59	0.406
CNM	8	3.5	2.01, 4.98	3	3	-1.96, 7.96	0.721

Table 13. Comparison of lack of job satisfaction affecting work plans between urban and rural areas for those planning to reduce hours or retire within 10 years

	Urban			Rural			Difference
	n	Mean	95% CI	n	Mean	95%CI	p-value
PA	15	3.66	2.89, 4.44	6	3.5	1.32, 5.67	0.861
NP	39	3.25	2.64, 3.86	5	4.6	2.52, 6.67	0.146
CNM	2	4	-8.70, 16.70	1	3	.	.

Speed/rate of reimbursement

There were no statistical differences in speed/rate of reimbursement affecting work plans between urban and rural areas for any provider (Tables 14 and 15). The urban versus rural difference in response was marginally significant for PAs over all (Table 14).

Table 14. Overall comparison of speed/rate of reimbursement affecting work plans between rural and urban areas.

	Urban			Rural			Difference
	n	Mean	95% CI	N	Mean	95%CI	p-value
PA	53	4.16	3.83, 4.50	16	3.37	2.55, 4.19	0.072
NP	120	4.41	4.15, 4.67	16	4.31	3.59, 5.03	0.776
CNM	11	5.54	5.19, 5.89	1	2	.	.

Table 15. Comparison of lack of speed/rate of reimbursement affecting work plans between urban and rural areas for those planning to reduce hours or retire within 10 years

	Urban			Rural			Difference
	n	Mean	95% CI	N	Mean	95%CI	p-value
PA	13	4	3.18, 4.81	8	3.87	2.36, 5.38	0.868
NP	42	4.23	3.73, 4.73	4	4.5	2.44, 6.55	0.721
CNM	.	.	.	.	.	.	.

Health

There were no statistical differences in health affecting work plans between urban and rural areas for any provider (Tables 16 and 17). The urban versus rural difference in response was marginally significant for CNMs over all (Table 16).

Table 16. Overall comparison of health affecting work plans between rural and urban areas.

	Urban			Rural			Difference
	n	Mean	95% CI	N	Mean	95%CI	p-value
PA	66	3.83	3.40, 4.25	17	4.52	3.77, 5.28	0.102
NP	136	3.30	3.03, 3.58	13	3.30	2.40, 4.21	0.998
CNM	12	3.16	2.23, 4.09	2	4.5	-1.85, 10.85	0.088

Table 17. Comparison of lack of health affecting work plans between urban and rural areas for those planning to reduce hours or retire within 10 years

	Urban			Rural			Difference
	n	Mean	95% CI	N	Mean	95%CI	p-value
PA	13	4.23	3.17, 5.28	7	4.71	3.23, 6.19	0.541
NP	41	3.73	3.20, 4.25	5	3.4	0.97, 5.82	0.730
CNM	4	2	0.70, 3.29	1	5	.	.

Increasing administrative burden

There were no statistical differences in increasing administrative burden affecting work plans between urban and rural areas for any provider (Tables 18 and 19).

Table 18. Overall comparison of increasing administrative burden affecting work plans between rural and urban areas.

	Urban			Rural			Difference
	n	Mean	95% CI	n	Mean	95%CI	p-value
PA	66	3.19	2.79, 3.59	18	3.33	2.55, 4.11	0.748
NP	133	3.24	2.97, 3.50	19	3.21	2.41, 4.00	0.940
CNM	12	3.25	2.38, 4.11	2	2.5	-16.55, 21.55	0.692

Table 19. Comparison of lack of increasing administrative burden affecting work plans between urban and rural areas for those planning to reduce hours or retire within 10 years

	Urban			Rural			Difference
	n	Mean	95% CI	n	Mean	95%CI	p-value
PA	17	2.82	2.04, 3.59	7	2.71	1.43, 3.99	0.866
NP	45	2.95	2.48, 3.43	7	2.71	1.33, 4.09	0.702
CNM	5	3.2	0.81, 5.58	1	4	.	.

Practice

There were no statistical differences in practice affecting work plans between urban and rural areas for NPs or CNMs (Tables 20 and 21). There was a low *p*-value (p=0.022) for the difference between PAs in urban and rural areas that plan to reduce hours or retire within 10 years the difference was statistically significant (Table 21). Further investigation to determine why practice is a factor between urban and rural areas may identify ways of encouraging PAs to defer retirement longer.

Table 20. Overall comparison of practice affecting work plans between rural and urban areas.

	Urban			Rural			Difference
	n	Mean	95% CI		n	Mean	p-value
PA	73	3.52	3.16, 3.87	19	3.89	3.17, 4.61	0.338
NP	133	3.76	3.50, 4.02	17	3.41	2.48, 4.33	0.446
CNM	7	4	2.80, 5.19	2	2	-10.70, 14.70	0.188

Table 21. Comparison of practice affecting work plans between urban and rural areas for those planning to reduce hours or retire within 10 years

	Urban			Rural			Difference
	n	Mean	95% CI	n	Mean	95%CI	p-value
PA	16	3.25	2.41, 4.08	8	4.5	3.72, 5.27	0.022
NP	44	4	3.57, 4.42	5	3.8	0.96, 6.63	0.856
CNM	3	5	2.51, 7.48	1	1	.	.

Other

There were no statistical differences from other factors affecting work plans between urban and rural areas for any provider (Tables 22 and 23).

Table 22. Overall comparison of other factors affecting work plans between rural and urban areas.

	Urban			Rural			Difference
	n	Mean	95% CI	n	Mean	95%CI	p-value
PA	24	3.37	2.39, 4.35	6	4.16	1.82, 6.50	0.459
NP	54	3.53	2.94, 4.12	6	2.83	0.79, 4.87	0.432
CNM	2	2.5	-16.55, 21.55	1	6	.	.

Table 23. Comparison of other factors affecting work plans between urban and rural areas for those planning to reduce hours or retire within 10 years.

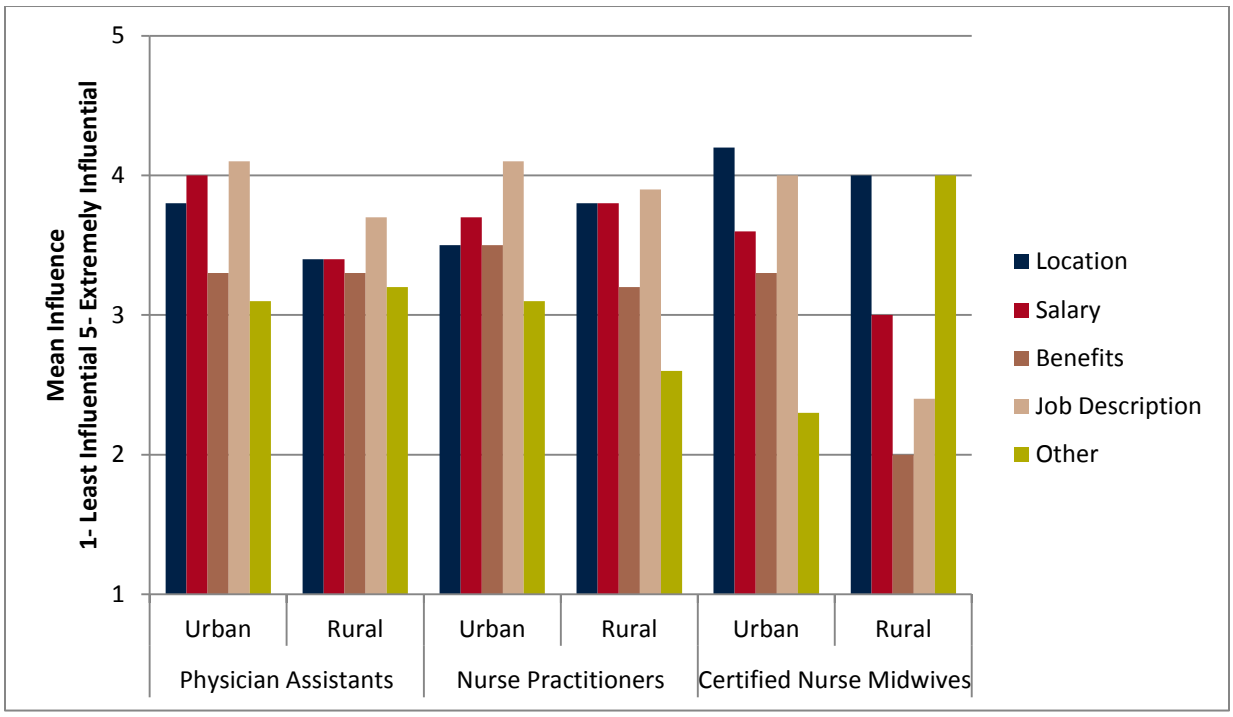
	Urban			Rural			Difference
	n	Mean	95% CI	n	Mean	95%CI	p-value
PA	8	4.87	3.36, 6.38	3	4	-0.96, 6.38	0.539
NP	15	3.93	2.79, 5.06	3	3	0.51, 5.48	0.262
CNM	.	.	.	.	.	.	.

2.4 Factors Affecting Decision to Accept Current Primary Position

The providers were asked “Please rank the influences for your decision to accept your current primary position” (Figure 17). The low PA, NP, and CNM response allowed comparison of only large differences between comparison groups that are unlikely to have occurred by chance alone (i.e., are statistically significant) (Appendix 1).

The following results compare urban and rural areas using *t*-tests for two independent samples with unequal variances for each provider type on each decision. Each test produces a test statistic and a *p*-value. The *p*-value is the probability that the test statistic would be as extreme as or more extreme than observed if the difference in averages between the compared groups was truly zero. A small *p*-value suggests that the observed difference in averages is not due to chance alone. Differences whose *p*-values are less than or equal to 0.05 are called "statistically significant" in most scientific work. Equivalently, 95% confidence intervals (CIs) can be constructed around each difference in urban and rural average. The 95% CIs in this analysis indicate that the upper and lower limits of the interval include the differences between urban and rural average values with 95% confidence (19 times out of 20 it is correct). A negative and positive value for the two CI values means that the estimates are not significantly different unless the *p*-value is small. It indicates the relative positions (higher or lower) between urban and rural values may actually be the reverse of what the sample averages indicate. (See Appendix 2 for a summary of survey responses).

Figure 17. Average influence of location, salary, benefits, job description, and other on decision to accept current primary position.



Location

There were no statistical differences in a location's influence on decisions for urban versus rural practice for CNMs (p=0.545, CI -0.84, 1.45). A one-sided test demonstrated location is more influential for rural than urban NPs (p=0.042), while the two-tailed test was marginally significant (p=0.0844, CI -0.77, 0.05). For PAs location was more influential for those in urban than rural areas (p=0.057) in a one-sided test.

Salary

There were no statistical differences on the influence of promised salary on decisions to accept their current primary position for urban versus rural CNMs (p=0.497; CI -1.75, 3.12) or for NPs (p=0.628; CI -0.44, 0.27). PAs were statistically different for urban versus rural practitioners (p=0.038; CI 0.03, 1.14) with salary being more important for those in urban areas (p=0.018).

Benefits

The influence of benefits was different for CNMs (p=0.084, CI -0.37, 3.53) with a higher importance for those in urban areas (p=0.042). There was no statistical difference on the influence of promised benefits on decision to accept their current primary position for urban versus rural NPs (p=0.270, CI -0.22, 0.79) or PAs (p=0.988, CI -0.60, 0.60).

Job Description

The influence of job description was marginally statistically different for CNMs (p=0.028, CI 0.17, 2.46) with a higher importance for those in urban areas (p=0.014). There was no statistical difference on the influence of promised job description on decision to accept their current primary position for urban versus rural NPs (p=0.310, CI -21, 0.65) or for PAs (p=0.186, CI –0.17, 0.85); however, those PAs in urban areas valued job description higher than those in rural areas (p=0.093).

Other

The influence of an 'other' factor was statistically different for CNMs (p=0.04, CI -3.24, -0.08) with a higher importance for those in rural areas (p=0.021). There was no statistical difference on the influence of something else on decision to accept their current primary position for urban versus rural NPs (p=0.235, CI -0.38, 1.46) or for PAs (p=0.780, CI -1.31, 1.00).

2.5 Supply of PA, NP, and CNM providers

Limitations of Licensing Board Data when Estimating Arizona Workforce Capacity

Arizona's licensing board data has limitations in providing timely, complete workforce information to inform policy decisions. By Arizona statute, licensing boards assure that licensees meet minimum professional standards and authorize them to practice in the state.

Underestimating, Overestimating and Accurately Estimating Arizona's Health Workforce - The four-year NP and CNM licensing renewal period obstructs timely data updates on direct patient care effort and practice location. In contrast, the two-year PA license renewal cycle and requirement to report changes in work or residence within 30 days, allows more real time data reporting and analysis.[r] Arizona's licensing boards do not assess provider full time equivalent (FTE) or direct patient care (DPC) effort. Because Arizona has reciprocity agreements with other states for nurses,[58] an active license does not mean an active practice here. Federal health provider employees working in Indian Health Service, Veteran's Administration and in other sites are exempt from state licensure requirements, and therefore may not be counted in FTE totals.[s] Some professionals with active Arizona licenses do not provide any or only a small percentage of their FTE in DPC, have retired, or moved to another state to practice and kept an active license. Licensing board data limitations challenge accurate workforce assessment. Some states (Oregon, New Mexico) require data collection by boards (FTE, DPC, practice site, hours/week, weeks/year worked) at the time of licensing and renewal allowing detailed analysis of health workforce capacity.

The survey response rates were sufficient to draw statistically significant conclusions for large differences between groups. However, the data cannot provide detailed interpretation of factors

[r] AZ Rev Stat § 32-2527, http://www.azleg.state.az.us/FormatDocument.asp?inDoc=/ars/32/02527.htm&Title=32&DocType=ARS
AZ Rev Stat § 32-2523, http://www.azleg.state.az.us/FormatDocument.asp?inDoc=/ars/32/02523.htm&Title=32&DocType=ARS
[s] AZ Rev Stat § 32-2524, http://www.azleg.gov/FormatDocument.asp?inDoc=/ars/32/02524.htm&Title=32&DocType=ARS

affecting the PA, NP, and CNM workforce capacity. Multiple, multimodal efforts were made to increase the survey response rate including emails, mailings, and phone calls.

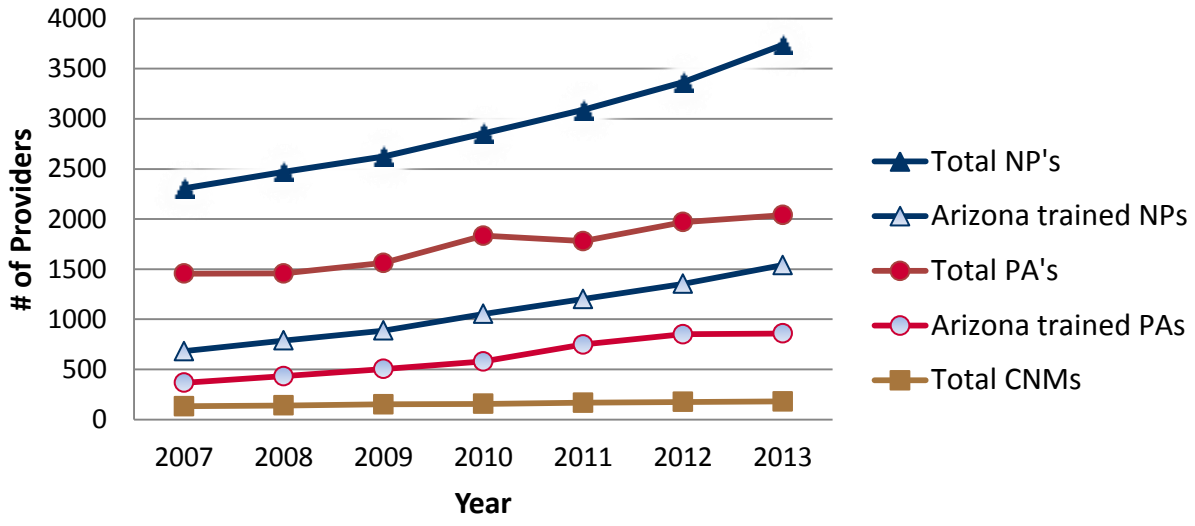
Training

Many actively licensed Arizona PAs and NPs graduated from Arizona universities (Figure 18). There are no Arizona CNM training programs. There are CNM graduate programs in the neighboring states of Colorado, New Mexico, Utah, and California. Accredited CNM programs offer post-baccalaureate certificates and master's degrees in nurse-midwifery and midwifery.[59]

There are three PA programs in Arizona accredited by the Accreditation Review Commission on Education for the Physician Assistant.[60] They are:

- A.T. Still University - Arizona School of Health Sciences, in Mesa (http://www.atsu.edu), offers a Master of Science degree in PA studies, requires 14 didactic and 12 months clinical coursework;
- Midwestern University, in Glendale (http://www.midwestern.edu), offers a Master of Medical Science in PA studies, requires 13.5 didactic and 13.5 months clinical coursework; and
- Northern Arizona University - Department of PA Studies, in Flagstaff, offers a Master's of PA Studies, (http://www.nau.edu/chhs/pa/welcome/), requires a 24-month curriculum, with 53 didactic and 47 clinical units in collaboration with the UA College of Medicine in Phoenix.

Figure 18. Number of active licensed physician assistants, nurse practitioners, and certified nurse midwives in Arizona from 2007 to 2013 along with the number that were trained in Arizona.[4, 61]



The majority of PAs licensed and residing in Arizona were trained in other states. The annual increase PAs can be attributed to the production and retention of Arizona trained PAs, based on the slopes of the total PAs and Arizona trained PAs per year (Figure 18). The very slight increase of PAs trained in Arizona in 2013 compared to 2012 can be attributed to loss from retirements and/or moving out of state. The production and retention of recently trained PAs from Arizona schools has otherwise been steady (Tables 24 and 25). There appears to be 4-year lag period for a PA graduation cohort to attain its peak contribution to the Arizona workforce (Table 25).

The average PA Program tuition cost is $51,000 for an in-state and $61,000 for an out-of-state resident. The average PA student debt is $100,000. Few PA students work and attend school full-time[t].

Table 24. Annual profile of physician assistant training in Arizona.

Matriculation/ Graduation	2010	2011	2012	2013	2014
A.T. Still University	69/67	73/73	70/69	70/70	67/--
Midwestern University	90/?	90/?	90/85	90/90	90/--
Northern Arizona University			25/0	25/0	50/24

Table 25. Annual number and percent of physician assistant graduate cohorts that contribute to the workforce in Arizona by university, graduation year, and year.

Active Arizona Licensed PA Cohorts		Year Reported by Licensing Board			
		2010	2011	2012	2013
A.T. Still University graduates	2010	33(49%)	33(49%)	34(51%)	36(54%)
	2011		41(56%)	46(63%)	48(66%)
	2012			43(62%)	47(68%)
	2013				36(51%)
Midwestern University graduates	2010	43	50	51	51
	2011		62	65	66
	2012			42(49%)	43(51%)
	2013				47(52%)

There are five Arizona NP programs approved by the Arizona State Board of Nursing and accredited by the Commission on Collegiate Nursing Education. They are:

- Arizona State University - College of Nursing & Health Care Innovation offers doctor of nursing practice (DNP) specialization in adult-gerontology, family, family psychiatric and mental health, neonatal, pediatric, and women's health.
- Grand Canyon University - College of Nursing & Health Sciences offers a master degree as family nurse practitioner (MS-FNP).
- Northern Arizona University - School of Nursing offers a master degree as family nurse practitioner (MS-FNP).
- University of Arizona - College of Nursing (CON) offers online DNP programs with specialization in adult acute care, family, and pediatric. It provides a Graduate Certificate in NP for those that have a MS in nursing and want to become an NP in family, adult-gerontology acute care, pediatric, or psychiatric mental health. The CON offers a Doctor of Philosophy (PhD) in nursing. These graduates must have received NP training in another program to practice as a NP. The numbers provided in Tables 26 and 27 are based on those students that resided in Arizona; students and graduates that resided in other states were not included.
- University of Phoenix - College of Health and Human Services offers a master degree as family nurse practitioner (MS-FNP).

The yearly increase in Arizona NPs (Figure 18) is only slightly due to the production and retention of Arizona trained NPs, based on the slopes of the total NPs and Arizona trained NPs per year. The steady

[t] http://www.aapa.org/the_pa_profession/quick_facts/resources/item.aspx?id=3839

annual increase in number of NPs licensed in Arizona is primarily from out of state recruitment. Arizona is one of 18 states where NPs can practice without physician oversight or supervision.[20] There appears to be 4-year lag period from NP graduation to peak contribution to the Arizona workforce (Tables 26 and 27).

Table 26. Annual profile of nurse practitioner training in Arizona.

Matriculation/ Graduation	Type	2010	2011	2012	2013
Arizona State University*	DNP				
Grand Canyon University*	MS-FNP				
Northern Arizona University	MS-FNP	?/5	?/12	?/16	?/20
University of Arizona	DNP	44/28	46/1	38/6	47/51
	NP Certificate	2/10	6/9	11/1	9/9
University of Phoenix	MS-FNP, MS-NP	?/147	?/143	?/122	?/166

* Blank cells indicate no information was provided by respective university.

Table 27. Annual number and percent of nurse practitioner graduate cohorts that contribute to the workforce in Arizona by university, graduation year, and year.

Active Arizona Licensed NP Cohorts		Year Reported by Licensing Board			
		2010	2011	2012	2013
Arizona State University*	2010	1	39	45	46
	2011		29	29	29
	2012			1	1
	2013				39
Grand Canyon University*	2010	18	28	29	30
	2011		24	29	29
	2012			20	39
	2013				31
Northern Arizona University	2010	4(80%)	5(100%)	5(100%)	5(100%)
	2011		6(50%)	7(58%)	8(67%)
	2012			14(88%)	14(88%)
	2013				19(95%)
University of Arizona	2010	19(50%)	26(68%)	26(68%)	27(71%)
	2011		2(20%)	2(20%)	2(20%)
	2012			3(43%)	4(57%)
	2013				23(38%)
University of Phoenix	2010	29(20%)	36(24%)	36(24%)	37(25%)
	2011		37(26%)	56(39%)	57(40%)
	2012			55(45%)	62(51%)
	2013				77(46%)

* Percent contribution could not be calculated because no information was provided by the respective university.

Universities, communities and legislators can implement policies to improve PA and NP graduate retention in Arizona. Clinical training location influences where providers practice after graduation.[62]

3. Recommendations

Improve Data Collection

Provider data from the Arizona licensing boards has limited utility to inform policy decisions regarding the training, recruitment, and retention of the health workforce. Using licensing data overestimates supply, affects federal designation of Health Professional Shortage Areas, and reduces HPSA/MUA/P scoring which in turn reduces funding from the 30 federal programs that use the scoring to prioritize award sites and amounts. Reduced funding means less resources to train, attract, retain and support the rural health infrastructure. This study collected data using low cost, web-based survey methods.

While the survey response rates were sufficient to draw statistically significant conclusions for large differences between groups, they were too low (9.7% for PAs, 11.3% for NPs and 23.0% for CNMs) to make precise workforce estimates or detect differences between groups about factors that public and private sector policy changes could improve. More comprehensive, real time, reliable data collected at the time of licensing and renewal will allow analysis by credible experts to help identify cost drivers, and suggest interventions to assure high quality, cost efficient, value base health care for all Arizonans.

Recommendations to improve health workforce data collection and analysis to inform policy are to:

- ***Obtain direct patient care (DPC) full time equivalent (FTE) effort at the time of licensing and renewal with a required, simple, 10-minute, online survey.*** Timely workforce data can inform policy decisions to address shortages and assure access to quality health care for all Arizonans. Accurate workforce data will improve federal funding including scholarships, loans, grants, and Medicare and Medicaid payment for undeserved and rural areas. Oregon, North Carolina and New Mexico are states[u] that enacted health workforce data collection and analysis at the time of licensing and renewal. Arizona's licensing boards[v] do not collect workforce information. Simple legislation would allow them to implement data collection at the time of licensing and renewal and to cover costs.[63, 64, 65] Analysis could be performed by appropriate entities to inform policy. Purchasing private sector data (e.g., health insurance companies) and acquiring public sector data (e.g., AHCCCS and Medicare) could assure more accurate and timely health workforce data collection and analysis to inform policy.

- ***Study and Develop Policies Enhance Arizona's Rural Health Professions Training, Supply and Distribution to areas of need.*** Other states have implemented initiatives to improve access to quality health care including retention strategies (e.g., Rural Health Professions Tax Credit in NM, OR), increasing community-based training in rural and underserved areas; Teaching Health Centers AL, AK, CA, CT, ID, IL, IA, KY, ME, MA, MI, MO, MT, NM, NY, NC, OK, PA, TX, WA, WV);

[u] SB 14 Health workforce Data Collection, Analysis and Policy Act http://www.nmlegis.gov/sessions/11%20regular/final/SB0014.pdf, ftp://www.nmlegis.gov/bills/house/HB0019.pdf

[v] These licensing boards are part of the governor's "90/10" agency, http://www.azgovernor.gov/bc/, where 90% of licensing fee revenues is deposited to the board's fund for appropriation by the Legislature toward fulfillment of the Board's statutory mandates. The remaining 10% of the funds collected are deposited into the State's General Fund for unrestricted use as determined by the Legislature.

- Allocate state general fund support for rural, community-based, interprofessionsal training infrastructure. (NM- Medicaid GME to expand Teaching Health Centers)
- Study and make recommendations to enhance Arizona's scope-of-practice for PA, NP, and CNM including payment for services.

Improve the Workforce Supply and Distribution

Retirement of Arizona's NP and CNM workforce will dramatically impact provider capacity over the next ten years as 70% of rural CNMs, 46% of urban CNMs, and 31% of NPs are age 55 or older. Providing an environment that supports recruitment of PA, NP, and CNM providers to rural and underserved areas can be an important tool in attracting providers to the state. Researchers in New Mexico surveyed graduates from health professional programs in New Mexico including PA and nursing programs, to determine factors associated with recruitment and retention to rural areas.[66] They found that participation in rural training programs and financial incentives such as rural health professions tax credits and loan forgiveness programs were important in the decision to start and remain in practice in a rural location.[66] Significant investment, planning, partnering, residencies, clinical rotations and other training in rural locations will benefit help assure a well-trained health workforce to meet the needs of all Arizonans, and provide jobs and economic development in rural areas.

Improve the Workforce Utilization

Other states demonstrate infant mortality reductions using team based care using CNMs. Reforming Arizona's scope-of-practice regulations[8] and provider reimbursement could facilitate value based, team based service and learning models. Physician assistants, NPs, and CNMs are key to enhancing access to high quality health care.

4. Conclusion

Access to high value, high quality care is attainable. Ensuring a well-trained and distributed health workforce for all Arizonans is paramount to improving health outcomes in rural areas, spurring economic development, and meeting health needs. Enhancing the rural, community based health professions training infrastructure could move the supply pipeline to areas of need, using community health centers (RHCs[w] and FQHCs), Indian Health Service, and Critical Access Hospitals[x] to serve as clinical training sites for PAs, NPs, and CNMs.

[w] Community health centers or CHCs (also known as Federally Qualified Health Centers or FQHCs) are non-profit clinics located in medically underserved areas – both rural and urban – throughout Arizona. They share a mission of making comprehensive primary care accessible to anyone regardless of insurance status. http://www.aachc.org/what-is-a-healthcare-center/

[x] Critical access hospitals are rural acute care hospital consisting of no more than 25 inpatient beds. The Critical Access Hospital must not exceed a ninety-six (96) hour length of stay and will have agreements, contracts or affiliations for transfer and services. Critical Access Hospitals must also be located more than a 35-mile drive from any other hospital or CAH (in mountainous terrain or in areas with only secondary roads available, the mileage criterion is 15 miles). http://crh.arizona.edu/programs/flex/cahs-list

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Appendices

Appendix 1: Methodology

Data Sources

Data sources:

- Arizona State Board of Nursing data on current advanced practice registered nurses, March 2013.
- Arizona Regulatory Board of Physician Assistants data on current physician assistants, June 2013.
- US Census 2010 data
- Rural-urban commuting area data (2006 ZIP version 2.0)[y]

Licensing board data methods

PA data were received from the Arizona Regulatory Board of Physician Assistants. The file contained information on all PAs with active and inactive licenses in Arizona. This file was imported to SAS Enterprise Guide (EG) version 4.3. The data was edited and cleaned to correct variation in data structure and formats, and filtered to remove individuals that did not currently reside in Arizona, and individuals who did not have an active license. Missing data was imputed deductively based on existing data for each record; however individuals with complete missing data (street address, zip code etc.) were excluded from the analysis.

Advanced practice registered nurse data (NP and CNMs) were acquired from the Arizona State Board of Nursing. The file contained information on all practicing APRNs in the state of Arizona. The file was imported to SAS EG and cleaned to correct variation in data structure and formats. Individuals with an advanced practice specialty defining themselves as NPs were selected for analysis. This included the following AP specialty types:

- Acute care nurse practitioner
- Adult nurse practitioner
- Adult psychiatric and mental health nurse practitioner
- Family nurse practitioner
- Family psychiatric and mental health nurse practitioner
- Gerontological nurse practitioner
- Neonatal nurse practitioner
- Nurse practitioner
- Pediatric acute care nurse practitioner
- Pediatric nurse practitioner
- Psychiatric and mental health nurse practitioner
- Psychiatric mental health nurse practitioner
- School nurse practitioner
- Women's health care nurse practitioner

[y] http://depts.washsington.edu/uwruca/ruca-download.php

Where possible missing information including city, state, and zip code were deductively imputed based on existing information for the member record. Individuals with complete missing information (including first/last name, address, zip code, etc.), an inactive license status, or individuals listing an address outside of Arizona were excluded from the analysis.

Both data sets were limited by several factors. First the data only provided one current address for the provider. It was not specified whether this is a home address or practice location. According to the survey information many PA, NP, and CNM providers, especially NPs, practice in multiple locations (Figure A1.1). As only one location is reported on the licensing board data, there is the potential to underestimate the rural workforce.[7] Multiple work addresses are not reported or captured in the current licensing data and represents a limitation of the workforce analysis.

Second the licensing data does not indicate whether the provider is actively practicing. While a provider may have an active license this does not indicate they are practicing in the state. When comparing the license data to the survey results we observed that many providers indicated that they are not practicing or are employed in a non-practice capacity (Figure A1.2). While these individuals maintain an active license they are not actively treating patients and can overinflate the provider counts and estimated coverage, especially in rural areas with small populations.

Third the data does not provide a description of the number of hours practiced each week or a means to calculate an FTE. This artificially inflates the counts of provider coverage and can give an inaccurate representation of the healthcare workforce in a specific location. As an example, one third of CNM survey respondents reported working less than 35 hours a week at their primary practice location; 38% of NP survey respondents reported working less than 35 hours a week; while 30% of PAs reported working less than 35 hours per week at their primary practice location (Figure A1.3).

The standard method for evaluating workforce coverage of a population is by dividing the number of providers by the estimated population that they serve and multiplying this proportion by 100,000 to produce a comparable metric, count per 100,000 population. This method is designed to allow a more direct comparison between different locations. Due to limitations with the licensing data it is possible these counts are inflated as individuals listed as practicing providers are counted when they are in fact not providing full time direct-care services (e.g., work time spent as administrators, supervisors, preceptors, etc.).

Survey methods

In 2012 and early 2013 survey instruments were developed for each PA, NP, and CNM provider group. The intent of the survey was to understand issues related to workforce in the state. These included decisions to accept the provider's primary position, factors affecting decisions to continue to practice, whether the provider is planning to retire or reduce practice hours in the future, etc. The instruments were finalized and made available to the providers via Survey Monkey. Different outreach strategies were utilized for the APRNs and the PAs.

Figure A1.1 Number of practice locations by provider type.

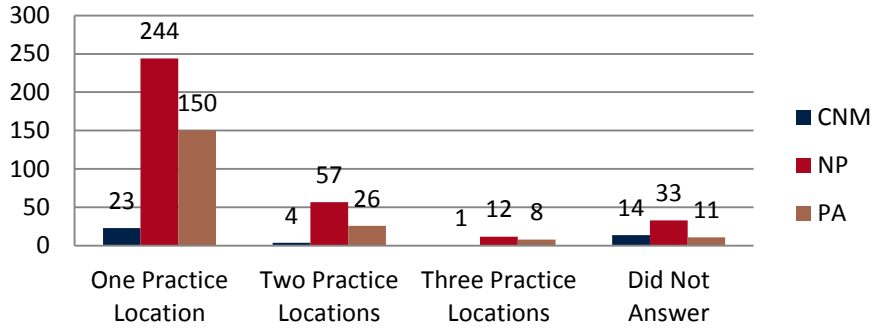


Figure A1.2 Number of survey respondents who reported being employed in a provider capacity.

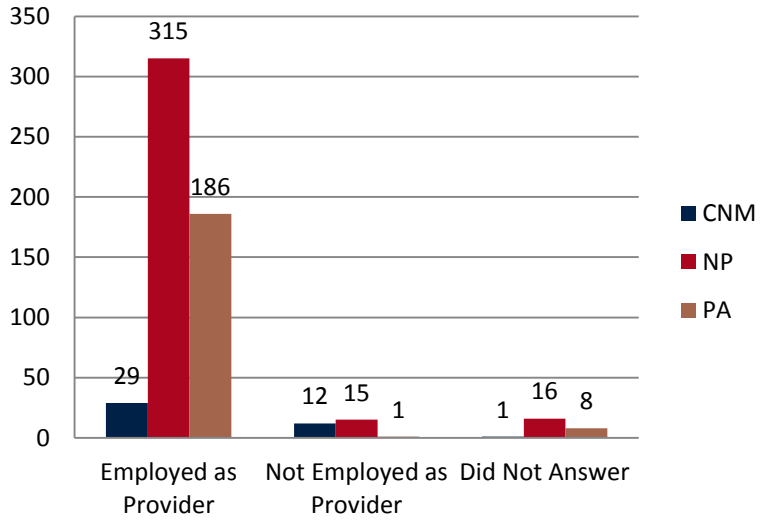
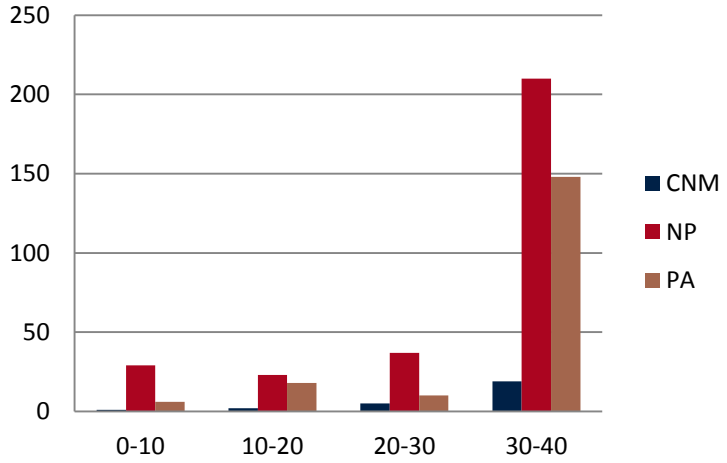


Figure A1.3 Hours per week worked at primary practice location.



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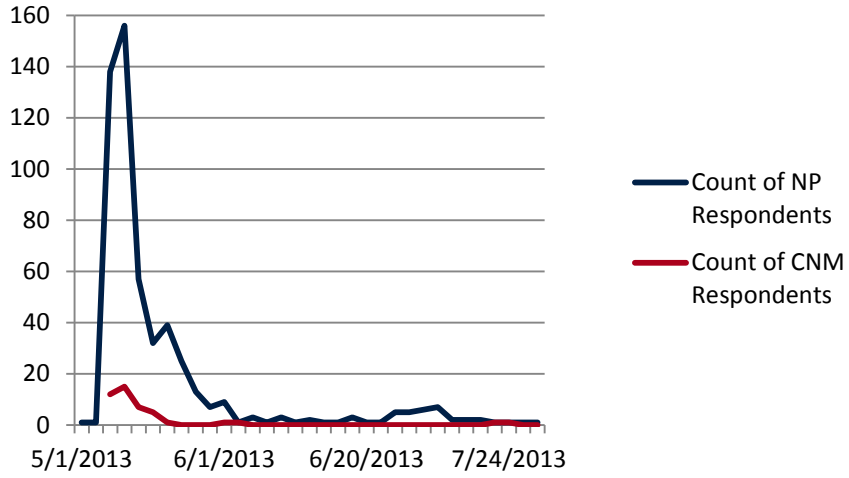
whether the provider is planning to retire or reduce practice hours in the future, etc. The instruments were finalized and made available to the providers via Survey Monkey. Different outreach strategies were utilized for the APRNs and the PAs.

All APRNs (NPs and CNMs) with a valid email address were sent an email with a statement of informed consent and a link to the Survey Monkey instrument. For NPs, 2994 emails were sent, 142 email addresses came back as invalid. For CNMs 176 emails were sent, 10 CNM emails bounced back as invalid. The individuals with invalid email addresses were sent a post card reminder with a link to the Survey Monkey instrument; 21 of the mailings were returned due to inaccurate addresses (Figure A1.4). The Arizona State Board of Nursing limited our recruitment efforts to one contact by email or postcard. No further recruitment efforts were permitted to achieve higher response rates.

Figure A1.4 Nurse practitioner and certified nurse midwife response during survey recruitment period.



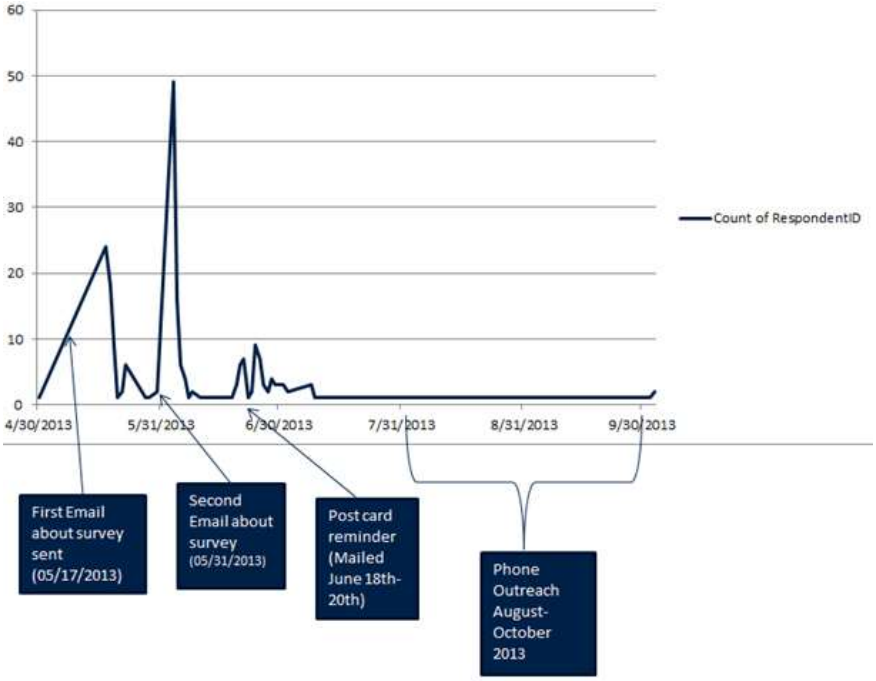
PAs were sent two emails regarding the survey instrument in May 2013. The initial email explained the survey and requested participation. The second email provided a further request to participate in the study. Both emails were sent from the president of the Arizona State Association of Physician Assistants (ASAPA).

A post card reminder was sent with information about the survey to all non-respondents in June 2013. A total of 181 of the post cards were returned due to insufficient addresses. Phone outreach to increase participation rates was conducted in July and August 2013 using phone numbers from the licensing board data for non-respondents. Phone calls were placed at various times during the work day including early evening in an effort to increase contact rates and survey participation (Figure A1.5).

With the multi-modal outreach conduct for PAs an analysis was conducted to determine the most effective means of contacting the PA's in the state. The majority of the survey responses were obtained from the initial and follow up emails sent from the ASAPA president. The post card mailings, which referenced the University of Arizona, the Arizona AHEC, and the ASAPA, generated a small increase in response rates. Phone outreach was the least effective and produced a small number of survey responses.

Reaching the PA population by phone presented a number of challenges. First many of the phone numbers provided in the licensing board data were for places of employment, not personal lines. This represented a challenge as many PAs work in large organizations that are reluctant to connect non patient calls. Second many of the numbers were inaccurate as the PA was no longer employed at the location and had no forwarding number. Finally, many PAs did not return messages left for them at their place of employment. It is possible that as the majority of PAs are under the age of 50, they are more likely to respond to a digital outreach method. Based on the results of this study, phone contact is not an appropriate outreach method for the PA population in the state.

Figure A1.5 Physician assistant response during survey recruitment period.



Rural assignment methods

The 34 rural-urban commuting area (RUCA) codes (version 2.0)[z] are based on Census 2000 tract level information. The classification is based on a combination of population density and commuting/connectivity information (e.g., percent flow to urban area) to characterize US Census tracts and finer scale US postal zip codes. This report aggregates the assigned RUCA codes into four classes: (1) urban areas (e.g., Phoenix) that include peri-urban and small town areas with good connectivity to urban areas (e.g. Maricopa), (2) large rural towns and surrounding areas (e.g., Payson), (3) small rural towns and surrounding areas (e.g., Chinle), and (4) isolated small rural towns and surrounding areas (e.g., Ashfork and Tombstone) (Tables A1.1-A1.4). These four categories are commonly used for health related projects.

Due to limited sample size from the web based survey the three rural categories were combined in the analysis. The resulting urban and rural categories approximate the US Office of Management and Budget's metro and non-metro classification. The location specific workforce information in this report

[z] Version 3 that is based on 2010 Census data and postal zip codes will be published early in 2014.

is based on self-reported addresses that professionals entered in a web-based survey or provided the licensing boards during applications or renewals.

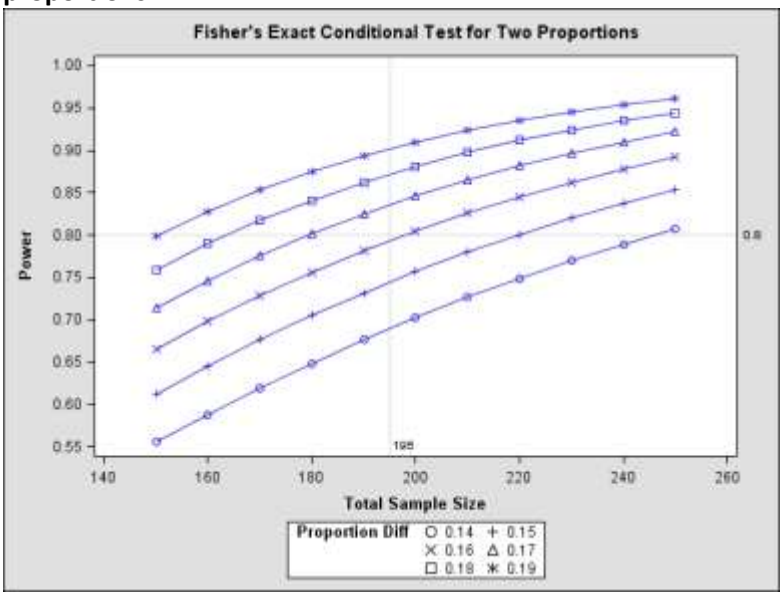
Physician assistants, NPs and CNMs data records from board data and survey data were joined by postal zip code assignments with a rural-urban commuting area (RUCA) classification dataset and prepared for analysis. Missing county and postal zip code data for residence or business locations were imputed from street address and city data, and internet website searches of practitioner's names. Unclear determinations were assigned to the more urban areas to reduce relative error.

Statistical Analysis methods

Survey data was assessed for missing variables using Stata 12.1. Missing age was imputed using graduation date with the assumption of graduation at the average age of 29[aa]. Two-group mean-comparison tests with unequal variances using Welch's approximation were performed by provider type to assess differences in age, age by sex, and age by urban versus rural. Two-group mean comparisons were also computed for influence of factors leading to decisions to accept current primary position, retire, reduce patient hours, move practice within or outside of Arizona, or close practice. Two-sample, two-sided test for differences in both hypergeometric and binomial proportions were performed.

The difference in binomial proportions (0.011) between the urban versus rural survey responses of PAs was not statistically significant (*p*-value = 0.67). The survey sample sizes (n=168 for urban, n=27 for rural, n=195 total) are too small to detect proportional differences less than 0.16 at the 80% statistical power benchmark (Figure A1.6). For the PA survey, a sample size of 195 only has 68% power to detect a modest 0.14 difference in response proportions; a sample size of 250 would be required to achieve the 80% power threshold. For future follow-up studies, sample sizes smaller than 250 are possible but only if detectable differences in response proportions greater than 0.14 can be tolerated.

Figure A1.6. Power vs total (urban + rural) sample size for detectable differences in response proportions.



[aa] http://www.midwestern.edu/programs-and-admission/az-physician-assistant-studies.html

Survey Power and Margin of Error Calculations Using Overall PA Survey Results as of 10/3/2013

Notes and Assumptions:

1) Physician Assistant (PA) numbers as of 01/08/2014
2) Power of current survey response comparing urban vs. (collapsed) non-urban categories
3) Two-sample, two-sided test for differences in binomial proportions (except where noted)
4) The categories are sampled from normal, independent populations
5) Hypothesis H_0: p1 = p2; d = 0 versus H_A: p1 ≠ p2; d ≠ 0
6) References: Rosner B. *Fundamentals of Biostatistics* . (2011) 7th ed. Ch.10, eqns 10.3 & 10.15
Evan Morris, Sampling from Small Populations,
http://uregina.ca/~morrisev/Sociology/Sampling%20from%20small%20populations.htm

	Pilot Study to Date	Change
(Urban) N1=	1674	
(Rural) N2=	242	
(Urban) n1 =	168	
(Rural) n2 =	27	(+3)
(Urban) p1 =	0.1004	
(Rural) p2 =	0.1116	
d = abs(p1-p2) =	0.0112	
p-bar =	0.102	
q1 = 1-p1 =	0.900	
q2 = 1-p2 =	0.888	
q-bar =	0.898	
a =	0.05	
z(1-a/2) =	1.96	

Overall survey results:

RUCA CatA	PA Surveys	Primary Patient Care #	Primary Patient Care of those surveye	PA Licensees	% Survey Response
1	168	102	60.7%	1674	10.0%
2	13	12	92.3%	130	10.0%
3	11	8	72.7%	92	12.0%
4	3	3	100.0%	20	15.0%
Total	195	125	64.1%	1916	10.2%

Collapse above into Urban (1) vs Non-Urban (2,3,4) Categories:

RUCA CatA	PA Surveys	Primary Patient Care #	Primary Patient Care of those surveye	PA Licensees	Survey Response
1	168	102	60.7%	1674	0.1004
2,3,4	27	23	85.2%	242	0.1116
Total	195	125	64.1%	1916	0.1018

Rosner, eqn 10.15

Φ^{-1}(power)	-1.372
power	0.0850

Pilot Study

	Hypergeometric	Binomial	
E based on N1	0.043	0.045	Morris: E = sqrt(z^2*p*q*(N-n)/(n*(N-1)))
E based on N2	0.112	0.119	= accuracy of sample proportions
E based on Overall N	0.040	0.042	(hypergeometric)
			E = sqrt(z2*p*q/n) (binomial)
z	0.425	Rosner, eqn 10.3	
Φ(z)	0.665		
p-value = 2*[1 - Φ(z)]	0.6705	p-value of difference in proportions: d = p1 - p2	

Check Pilot Study using Contingency Table:

Observed

	Response	No Response	total
Urban	168	1506	1674
Rural	27	215	242
total	195	1721	1916

Expected

	Response	No Response	total
Urban	170.4	1503.6	1674
Rural	24.6	217.4	242
total	195	1721	1916
		chi-squared=	0.181
		p-value=	0.6705

Yates-corrected 2-sided chi-squared test

Distribution of Arizona's Population, Providers, and Survey Respondents

The following figures illustrate the age distribution of Arizona's total and fecund (females of child bearing age) populations (Figures A1.7 and A1.8) for comparison with the age distribution of Arizona providers (Figures 1-6).

Figure A1.7 Urban and rural age groupings of Arizona's 2010 population of 6,392,017 (US Census).

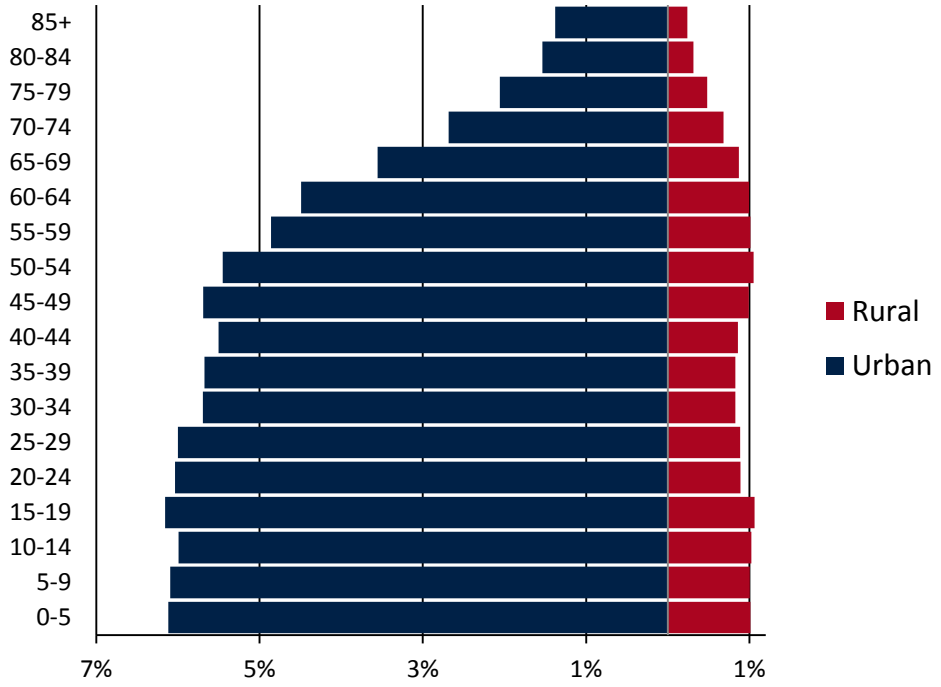


Figure A1.8 Urban and rural age groupings of Arizona's 2010 fecund population of 1,262,543 (US Census).

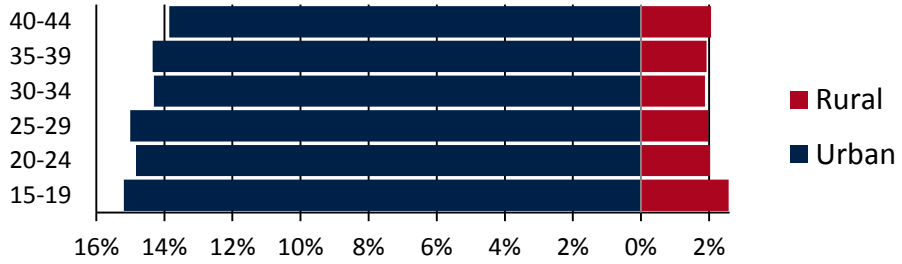


Table A1.1 Distribution of population, providers, and survey respondents by RUCA urban cities and towns.

Urban zip code RUCA assignments								
City/Town area	Total pop.	Fecund pop.	PA survey	PA board	NP survey	NP board	CNM survey	CNM board
Aguila*	1,197	187						
Amado*	2,231	403						
Apache Junction	49,387	6,858	1	7	3	15		
Arivaca*	698	60						
Arlington*	752	149						
Avondale	74,817	17,881	1	23	5	26		2
Bellemont*	385	92						
Black Canyon City	2,886	364				2		
Buckeye	63,868	12,681		7		8		
Carefree	3,051	222		1	1	5		
Cave Creek	26,960	4,421			2	29		1
Chandler	255,641	54,535	13	92	17	161	2	12
Chino Valley	15,822	2,344		1		5		
Congress	2,146	167				1		
Crown King*	177	17						
Dewey	8,858	985				7		
El Mirage	31,787	7,382		1		2		
Flagstaff	84,499	22,144	3	35	9	76		5
Fort McDowell	1,249	235						1
Fountain Hills	22,684	2,729		5	3	20		
Gadsden*	700	150						
Gila Bend*	2,793	553						
Gilbert	211,167	48,053	14	94	17	187	2	8
Glendale	280,389	60,015	13	101	7	109		5
Glendale Luke Air Force Base	1,485	248		4				
Gold Canyon	12,246	1,084	1	7	1	9		
Goodyear	67,037	15,965	2	34	2	45		1
Gray Mountain*	62	8						
Green Valley	28,220	1,323	2	4	2	10		
Happy Jack*	703	34						
Humboldt	1,179	180				1		
Kirkland*	1,637	158						
Laveen	35,586	8,937	1	3	2	13		
Leupp*	1,802	338						
Litchfield Park	26,262	5,583		4		14		1
Lukeville*	39	8						
Mammoth*	1,725	295						
Marana	22,873	3,908		2	2	21		
Maricopa	51,612	11,343		2	1	11		1
Mayer	5,734	759				2		
Mesa	478,404	93,901	13	160	25	183		5
Mormon Lake*	77	9						
Morristown	1,578	231				1		
Mount Lemmon*	50	6						
New River	7,708	1,258			1	10		
Oracle	4,073	607				4		
Palo Verde*	196	35						
Paradise Valley	17,047	2,280		4	1	15		
Paulden	4,985	838				1		
Peoria	158,093	31,617	4	47	10	98	2	4
Phoenix	1,312,922	287,017	37	556	57	574	6	33
Prescott	55,321	6,758	3	30	10	59	1	3
Prescott Valley	41,635	7,409		6	3	13		
Queen Creek	48,870	10,898		7	1	30		1
Red Rock	2,106	532				2		
Rillito*	97	14						
Rio Verde*	2,111	54						
Sahuarita	23,568	5,084			2	16		
San Luis	25,517	6,010		5		1		
San Tan Valley	71,726	16,488		4	3	16		1
Sasabe*	54	5						
Scottsdale	268,597	46,428	17	155	22	246	4	10

Urban zip code RUCA assignments								
City/Town area	Total pop.	Fecund pop.	PA survey	PA board	NP survey	NP board	CNM survey	CNM board
Skull Valley*	743	110						
Somerton	21,214	4,260		1		3		2
Stanfield*	1,368	280						
Sun City	45,145	1,916	2	31	4	8		
Sun City West	27,703	442		27		5		
Superior	2,872	431	1	1				
Surprise	119,941	22,825	4	21	6	43		
Tacna*	461	72						
Tempe	167,311	43,270	4	47	10	68	1	2
Tolleson	31,011	7,695			1	2		
Tonopah*	6,645	1,269						
Tucson	880,383	175,726	26	165	67	529	14	42
Vail	21,753	4,225			2	20	1	2
Waddell	8,745	1,846			1	10		
Wellton	4,539	604			1	1		
Wickenburg	8,621	1,129		4		2		
Wittmann	6,700	1,210				3		
Yarnell	663	36				1		
Youngtown	6,156	1,143			1	2		
Yuma	141,891	26,539	6	53	4	36	3	7

* Towns without actively licensed PAs, NPs, and CNMs as reported by the Arizona licensing boards.

Table A1.2 Distribution of population, providers, and survey respondents by RUCA rural large towns.

Large town zip code RUCA assignments								
City/Town area	Total pop.	Fecund pop.	PA survey	PA board	NP survey	NP board	CNM survey	CNM board
Arizona City	10,677	1,944				1		
Bapchule*	2,178	496						
Casa Grande	62,569	11,538	4	22	4	17		1
Central	623	108	1	1		1		
Chloride*	403	24						
Cibola*	259	37						
Clarkdale	4,168	596				3		
Cottonwood	23,344	3,746		13	3	16	1	1
Dolan Springs*	2,224	203						
Douglas	21,230	3,694	1	3		1		
Eden*	21	4						
Ehrenberg*	1,482	244						
Florence	33,556	3,242		10	1	4		
Fort Huachuca	5,601	1,432		3				
Fort Thomas*	408	56						
Globe	13,345	2,143	1	10		2		
Golden Valley	12,103	1,201		1	1	2		
Hackberry*	224	21						
Hereford	9,413	1,427		1	2	8		1
Huachuca City	5,566	957				1		
Jerome	477	71				1		1
Kingman	50,760	8,161	3	24	2	19	1	1
Lake Havasu City	55,808	7,706	1	15	2	20		
Meadview	1,289	66				1		
Miami*	4,520	684						
Nogales	23,054	4,487				4		
Payson	21,877	2,676	1	5	1	8		
Peach Springs*	1,490	289						
Pima	3,822	697			1	2		
Pine	2,949	195				1		
Pirtleville*	1,021	195						
Rio Rico	19,080	4,112				4		
Safford	19,677	3,287	1	17		4	1	1
Sierra Vista	50,006	9,319		13	3	28		1
Solomon*	405	63						
Temple Bar Marina*	76	12						
Thatcher	6,218	1,367				2		
Tonto Basin*	1,501	92						
Valentine*	76	10						
Wikieup*	222	26						
Willow Beach*	311	28						
Young*	778	62						

* Towns without actively licensed PAs, NPs, and CNMs as reported by the Arizona licensing boards.

Table A1.3 Distribution of population, providers, and survey respondents by RUCA rural small towns.

Small town zip code RUCA assignments								
City/Town area	Total pop.	Fecund pop.	PA survey	PA board	NP survey	NP board	CNM survey	CNM board
Ajo	4,435	666		2		1	1	1
Alpine*	464	48						
Benson	9,464	1,283		1	3	7		1
Bisbee	7,155	1,012				8		2
Blue*	41	2						
Bouse*	1,212	79						
Bullhead City	40,544	6,035	2	19	3	14		1
Bylas*	2,069	472						
Cameron*	1,941	375						
Chinle	10,714	2,227		1		2	1	4
Cibecue*	1,800	410						
Clay Springs	621	94				1		
Clifton	2,943	511	1	2				
Cochise	1,184	126				1		
Colorado City	6,085	1,224				2		3
Coolidge	14,823	3,028		2		1		
Cornville*	5,152	642						
Dennehotso*	1,199	235						
Dragoon	392	41				1		
Eagar	4,893	867		2		2		
Eloy	18,017	2,239		2		2		
Forest Lakes*	207	18						
Fort Apache*	265	55						
Fort Defiance	5,835	1,163	1	3	1	5		2
Fort Mohave	13,863	2,097		3		1		
Ganado	7,682	1,461		2				1
Greer*	176	16						
Holbrook	5,676	1,102		2		1		
Houck*	1,321	266						
Indian Wells*	1,856	347						
Joseph City	1,509	274				1		
Kaibeto*	2,311	470						
Kayenta	7,844	1,672		1		1		
Lakeside	8,322	1,348	1	3	1	7		3
Littlefield	3,933	557		2				
Lupton*	752	124						
Many Farms*	2,338	478						
McNary*	1,086	239						
Mohave Valley	6,906	1,054			1	1		
Morenci	2,874	645		4				
Munds Park	667	76			1	1		
Naco*	897	177						
Navajo*	185	36						
Nazlini*	1,088	219						
Nutrioso*	364	28						
Oatman*	111	8						
Page	10,283	2,040	4	6		4		
Parker	9,147	1,461		4		1		
Pearce	1,983	172				1		
Peridot*	3,196	733						
Petrified Forest Natl Pk*	47	8						
Picacho*	515	84						
Pinedale*	574	79						
Pinetop	4,735	649		2		4		
Pomerene*	968	153						
Poston*	419	80						
Quartzsite*	4,423	238						
Round Rock*	1,171	252						
Saint David*	2,819	351						
Saint Johns	4,293	631		1				
Saint Michaels	3,694	667		1				
San Carlos*	4,790	1,064						

Small town zip code RUCA assignments								
City/Town area	Total pop.	Fecund pop.	PA survey	PA board	NP survey	NP board	CNM survey	CNM board
San Manuel	3,630	629				1		
Sedona	17,669	1,777	1	3		13		2
Shonto*	1,935	369						
Show Low	17,207	2,621	1	10		7	1	2
Snowflake	7,638	1,207		1		3		1
Springerville	2,366	409		2		3		
Sun Valley*	320	47						
Taylor	4,400	788				1		
Tonalea*	3,825	778						
Topock*	2,104	170						
Tuba City	11,354	2,484		6				1
Vernon*	1,443	198						
White Mountain Lake*	178	21						
Whiteriver	9,941	2,212		3	1	1		
Willcox	9,810	1,543			3	4		
Window Rock	2,894	592				1		
Winslow	14,970	2,713		5		7		
Woodruff*	80	8						
Yucca*	913	64						

* Towns without actively licensed PAs, NPs, and CNMs as reported by the Arizona licensing boards.

Table A1.4 Distribution of population, providers, and survey respondents by RUCA isolated rural small towns.

Isolated small town zip code RUCA assignments								
City/Town area	Total pop.	Fecund pop.	PA survey	PA board	NP survey	NP board	CNM survey	CNM board
Ash Fork*	1,885	220						
Bagdad	2,219	427		1				
Blue Gap*	1,793	369						
Bowie	597	75				1		
Camp Verde	11,480	1,692		1	1	4		
Chambers*	1,464	222						
Concho*	2,683	279						
Dateland*	790	122						
Duncan*	2,588	390						
Elfrida	1,333	183				1		
Elgin*	965	118						
Fredonia	2,210	404	1	2				
Grand Canyon	2,627	652				1		
Hayden*	630	111						
Heber	1,102	135				1		1
Hotevilla*	1,374	233						
Keams Canyon	2,271	433				1		
Kearny	2,329	345		1				
Kykotsmovi Village*	1,467	280						
Lukachukai*	2,340	497						
Marble Canyon*	388	61						
McNeal	1,277	157				2		
Mexican Hat*	20	2						
Monument Valley*	280	66						
North Rim*	28	8						
Overgaard*	3,033	280						
Parks	759	100				1		
Patagonia	1,426	173			1	1		1
Pinon	5,358	1,051		1				
Polacca	1,778	344		2				
Red Valley*	1,267	232						
Rimrock	4,806	758				2		
Rock Point*	1,650	342						
Roll*	716	126						
Roosevelt*	583	49						
Sacaton	4,543	1,057	1	8				
Salome	2,786	174				1		
San Simon	835	88				1		
Sanders	2,439	474		1				
Second Mesa*	1,798	364						
Seligman*	1,267	135						
Sells	6,490	1,389	1	1	2	2		
Sonoita	1,268	118		1	1	3		
Supai*	487	116						
Teec Nos Pos*	3,011	549						
Tombstone*	1,973	224						
Tsaile	2,090	514		2				
Tubac	1,311	89			1	1		
Tumacacori*	441	76						
Wenden*	761	113						
Williams	6,090	958				3		
Winkelman*	2,120	308						

* Towns without actively licensed PAs, NPs, and CNMs as reported by the Arizona licensing boards.

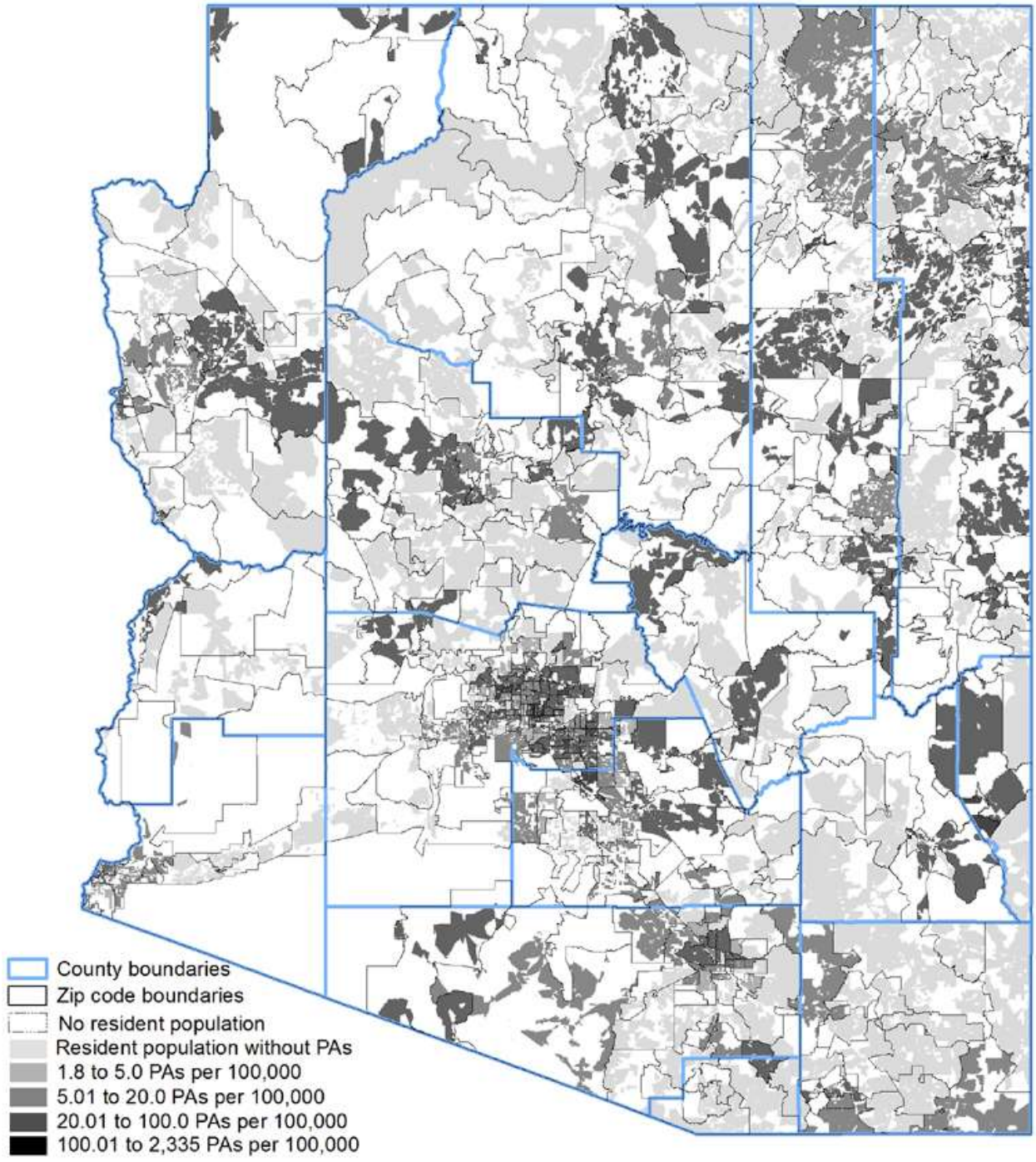
Appendix 2. Survey response data

A2.1 Physician assistant licensure and survey data

Table A2.1 Respondent characteristics of physician assistant survey.

Characteristic	Overall	Urban	Large rural town	Small rural town	Isolated small rural town
Licensed PA Respondents	195	168	13	11	3
Licensed obtained in AZ	98	87	6	3	2
Age in years Mean (SD)	48.8 (12.0)	48.4 (12.0)	52.6 (13.2)	50.6 (9.9)	54.2 (11.2)
Female	19.4%	81.2%	80.6%	71.4%	77.8%
Ethnicity % (n)					
Alaskan Native/Native American	2.7 (5)	2.5 (4)		9.1 (1)	
Asian or Pacific Islander	2.2 (4)	2.5 (4)			
Black/African American (non-Hispanic)	1.6 (3)	1.9 (3)			
Hispanic/Latino	4.9 (9)	5.7 (9)			
White (non-Hispanic)	87.0 (161)	85.4 (135)	100 (13)	90.9 (10)	100 (3)
Other	1.6 (3)	1.9 (3)			

Map A2.1 Population coverage by physician assistants in areas with residential populations (US Census 2010).



Map A2.2 Physician assistant survey response rate in areas with residential populations (US Census 2010).

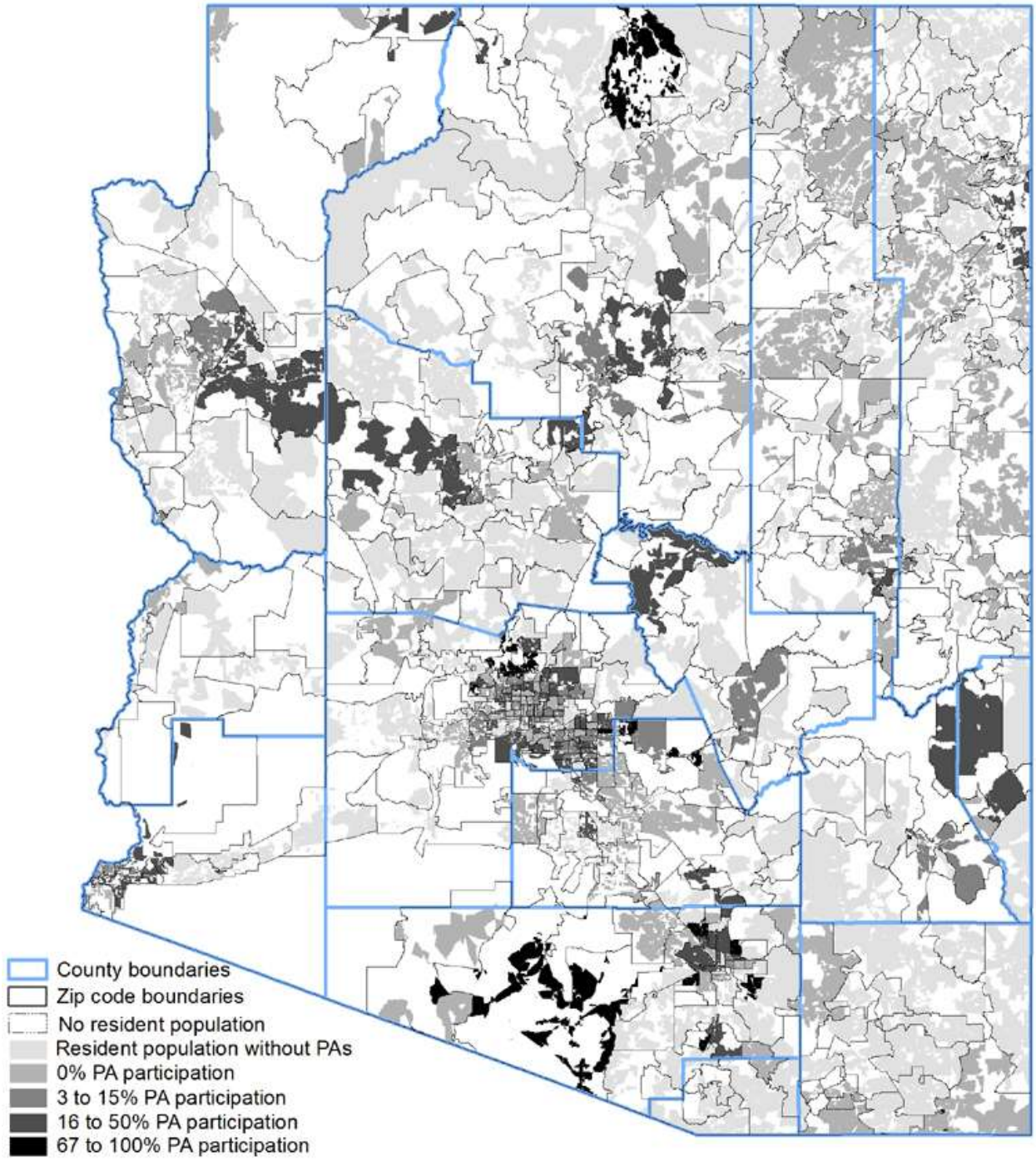


Table A2.2 Physician assistant response summary on practice type, hours of work, and payment source.

Primary Work Setting % (n)	Overall	Urban	Large rural town	Small rural town	Isolated small rural town
Practice Type					
Primary Care	63.6 (124)	60.1 (101)	92.3 (12)	72.7 (8)	100 (3)
Specialty	26.7 (52)	29.2 (49)	7.7 (1)	18.2 (2)	0 (0)
Total hours/week spent at facility					
Less than 5 hours	0.5 (1)	0.6 (1)			
5-10 hours	2.6 (5)	2.4 (4)	7.7 (1)		
10-15 hours	6.2 (12)	7.1 (12)			
15-20 hours	3.1 (6)	3.0 (5)	7.7 (1)		
20-25 hours	2.6 (5)	1.8 (3)	7.7 (1)	9.1 (1)	
25-30 hours	2.6 (5)	3.0 (5)			
30-35 hours	11.3 (22)	12.5 (21)		9.1 (1)	
35-40 hours	26.2 (51)	25.6 (43)	30.8 (4)	18.2 (2)	66.7 (2)
More than 40 hours	38.5 (75)	36.3 (61)	46.2 (6)	63.6 (7)	33.3 (1)
No Response	6.7 (13)	7.7 (13)			
Patient Primary Source of Payment Mean % (SD)					
Medicare	34.0 (23.8)	34.9 (24.6)	30.5 (13.6)	35 (25.4)	20
Tricare/VA/IHS	13.8 (24.6)	13.2 (23.2)	15.7 (31.8)	7 (5.1)	100
Self-Pay	9.6 (12.6)	9.9 (13.4)	9.1 (5.1)	5.2 (2.9)	15
Other	42.9 (41.5)	37.1 (40.6)	58.8 (48.0)	74.5 (36.1)	

Table A2.3 Physician assistant response summary on influences for selecting practice location.

Influence on decision to accept current primary position Mean (Median)	Overall	Urban	Large rural town	Small rural town	Isolated small rural town
1=Not influential 2=Least influential 3=Somewhat influential 4=Most influential 5=Extremely influential					
Location	3.8 (4)	3.8 (4)	3 (3)	3.9 (4)	3.3 (3)
Salary	3.9 (4)	4.0 (4)	3.6 (4)	3.4 (4)	3 (3)
Benefits	3.3 (3)	3.3 (3)	3.5 (4)	3 (3)	4 (4)
Job Description	4.1 (4)	4.1 (4)	3.8 (4)	3.5 (4)	4.7 (5)
Other	3.2 (4)	3.1 (4)	3 (3.5)	3.4 (4)	-

Table A2.4 Physician assistant response summary on future work plans.

In how many years do you plan to do the following? % (n)	Overall	Urban	Large rural town	Small rural town	Isolated small rural town
Retire					
<1 year	1.0 (2)	0.6 (1)	0 (0)	0 (0)	0 (0)
1-2 years	3.6 (7)	3.6 (6)	7.7 (1)	0 (0)	0 (0)
3-5 years	7.7 (15)	5.4 (9)	23.1 (3)	18.2 (2)	33.3 (1)
6-10 years	11.8 (23)	10.1 (17)	30.8 (4)	18.2 (2)	0 (0)
>10 years	36.4 (71)	38.1 (64)	23.1 (3)	9.1 (1)	33.3 (1)
No plans/Do not know	30.8 (60)	32.1 (54)	15.4 (2)	27.3 (3)	33.3 (1)
No response	8.7 (17)	10.1 (17)	0 (0)	27.3 (3)	0 (0)
Significantly Reduce Patient Hours					
<1 year	4.6 (9)	5.4 (9)	0 (0)	0 (0)	0 (0)
1-2 years	5.6 (11)	6.0 (10)	7.7 (1)	0 (0)	0 (0)

In how many years do you plan to do the following? % (n)	Overall	Urban	Large rural town	Small rural town	Isolated small rural town
3-5 years	11.3 (22)	8.9 (15)	38.5 (5)	18.2 (2)	0 (0)
6-10 years	10.3 (20)	9.5 (16)	2 (15.4)	2 (18.2)	0 (0)
>10 years	17.4 (34)	17.9 (30)	7.7 (1)	18.2 (2)	33.3 (1)
No plans/Do not know	38.5 (75)	38.1 (64)	30.8 (4)	45.5 (5)	66.7 (2)
No response	12.3 (24)	14.3 (24)	0 (0)	0(0)	0 (0)
Move practice to another geographical location in AZ					
<1 year	4.6 (9)	3.0 (5)	15.4 (2)	18.2 (2)	0 (0)
1-2 years	2.1 (4)	1.8 (3)	0 (0)	9.1 (1)	0 (0)
3-5 years	3.1 (6)	3.0 (5)	7.7 (1)	0 (0)	0 (0)
6-10 years	1.0 (2)	1.2 (2)	0 (0)	0 (0)	0 (0)
>10 years	1.5 (3)	1.8 (3)	0 (0)	0 (0)	0 (0)
No plans/Do not know	73.3 (143)	73.2 (123)	69.2 (9)	72.7 (8)	100.0 (3)
Move practice location outside AZ					
<1 year	3.1 (6)	1.8 (3)	7.7 (1)	18.2 (2)	0 (0)
1-2 years	1.5 (3)	1.2 (2)	7.7 (1)	0 (0)	0 (0)
3-5 years	3.6 (7)	3.6 (6)	7.7 (1)	0 (0)	0 (0)
6-10 years	2.1 (4)	2.4 (4)	0 (0)	0 (0)	0 (0)
>10 years	3.1 (6)	3.6 (6)	0 (0)	0 (0)	0 (0)
No plans/Do not know	72.8 (142)	71.4 (120)	76.9 (10)	81.8 (9)	100.0 (3)
No response	13.9 (27)	16.1 (27)	0 (0)	0 (0)	0 (0)

In how many years do you plan to do the following? % (n)	Overall	Urban	Large rural town	Small rural town	Isolated small rural town
Close Practice					
<1 year	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
1-2 years	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
3-5 years	0.5 (1)	0.6 (1)	0 (0)	0 (0)	0 (0)
6-10 years	1.0 (2)	0 (0)	15.4 (2)	0 (0)	0 (0)
>10 years	0.5 (1)	0.6 (1)	0 (0)	0 (0)	0 (0)
No plans/Do not know	79.0 (154)	78.0 (131)	69.2 (9)	100.0 (11)	100.0 (3)
No response	19.0 (37)	20.8 (35)	15.4 (2)	0 (0)	0 (0)

Table A2.5 Physician assistant response summary on factors influencing future work plans.

If you plan on retiring, significantly reducing patient hours, moving your practice or closing your practice rank from 1 to 6 in order of importance, with 1 being the most important and 6 being least important, the factors that led to this decision.

Factors that led to decision	Overall	Urban	Large rural town	Small rural town	Isolated small rural town
	Mean(Median)				
	1=Most Important 6=Least Important				
Age	2.6 (1)	2.6 (1)	2.1 (2)	2.1 (1)	2.5 (2.5)
Lack of job satisfaction	3.4 (3)	3.3 (3)	4.1 (4.5)	2.6 (2)	No responses
Speed/rate of reimbursement	4.0 (4)	4.2 (4)	4 (4.5)	2.6 (2)	4
Health	4.0 (4)	3.8 (4)	4.4 (5)	4.6 (5)	5
Increasing administrative/regulatory burden	3.2 (3)	3.2 (3)	2.8 (3)	3.9 (4)	4 (4)
Practice	3.6 (4)	3.5 (3)	3.3 (4)	5 (5)	3 (3)
Other	3.5 (4)	3.4 (4)	4.3 (6)	3 (3)	6 (6)

Table A2.6 Physician assistant response summary on Medicare/Medicaid acceptance and practice ownership.

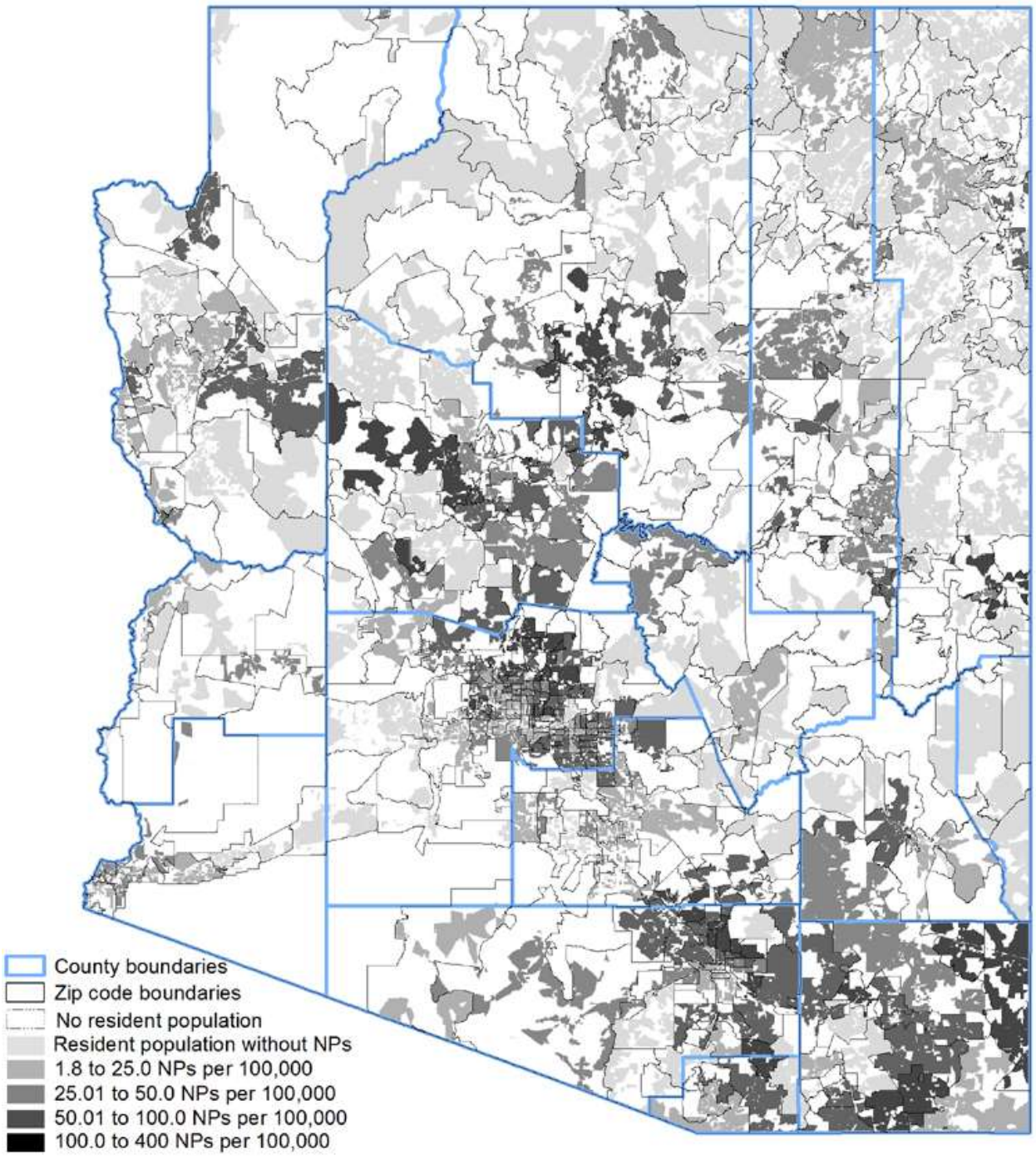
Practice Questions	Overall %	Urban	Large rural town	Small rural town	Isolated small rural town
Currently accepting Medicare/Medicaid patients					
Both Medicare/Medicaid	58.0	54.2	76.9	81.8	100.0
Medicaid Only	4.1	4.8	0	0	0
Medicare Only	13.9	15.5	0	9.1	0
Neither	13.3	13.1	23.1	9.1	0
No response	10.7	12.5	0	0	0
If no, why not?					
Reimbursement rates too low	9.7	10.7	0	9.0	0
Practice is at maximum capacity	2.0	2.3	0	0	0
No new members available	0.5	0.6	0	0	0
Other	12.3	11.9	23.0	9.0	0
Currently practice on your own					
Full Ownership	0.5	0.6	0.0	0.0	0.0
Part Ownership	4.6	3.5	7.6	18.1	0.0
No Ownership	85.1	84.5	92.3	81.8	100.0
No response	9.7	11.3	0.0	0.0	0.0

A2.2 Nurse Practitioner licensure and survey data

Table A2.7 Respondent characteristics of nurse practitioner survey.

Characteristic	Overall	Urban	Large rural town	Small rural town	Isolated small rural town
Licensed NPs	346	306	20	14	6
Licensed obtained in AZ	205	182	12	9	2
Age in years Mean(SD)	50.5 (11.1)	50.2 (11.2)	53 (11.8)	49.9 (8.2)	58 (8.1)
Female	89.9%	88.6%	100%	100%	100%
Ethnicity n (%)					
Alaskan Native/Native American	1 (0.3)	1 (0.3)			
Asian or Pacific Islander	8 (2.4)	8 (2.8)			
Black/African American (non-Hispanic)	4 (1.22)	4 (1.4)			
Hispanic/Latino	15 (4.6)	13 (4.5)	1 (5.0)	1 (7.1)	
White (non-Hispanic)	298 (90.9)	263 (90.4)	19 (95.0)	13 (92.9)	3 (100)
Other	2 (0.6)	2 (0.7)			

Map A2.3 Population coverage by nurse practitioners in areas with residential populations (US Census 2010).



Map A2.4 Nurse practitioner survey response rate in areas with residential populations (US Census 2010).

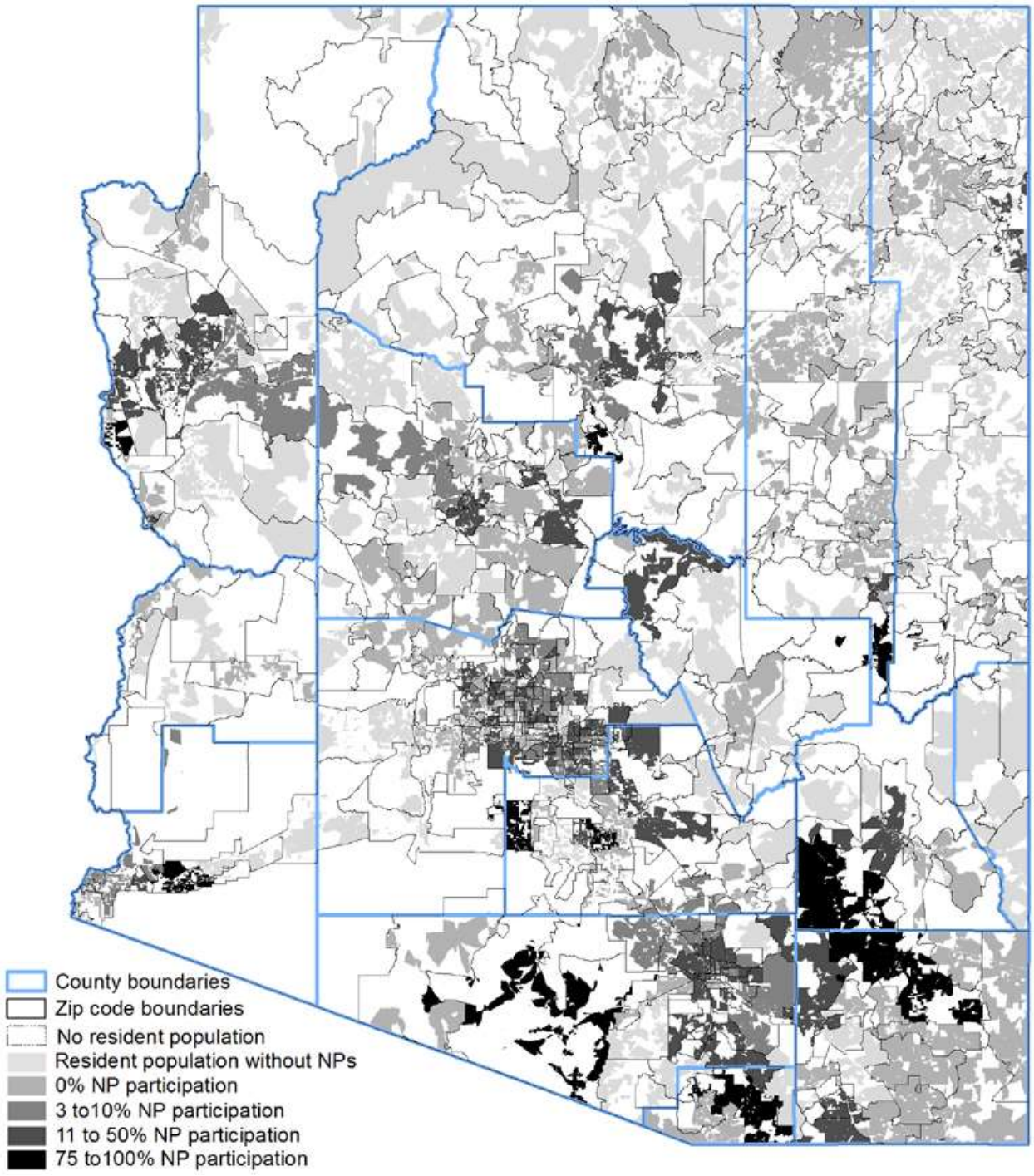


Table A2.8 Nurse practitioner response summary on practice type, hours of work, and payment source.

Primary Work Setting	Overall	Urban	Large rural town	Small rural town	Isolated small rural town
Practice Type					
Primary Care	59.8%	57.5%	75.0%	92.9%	50.0%
Specialty	26.6%	29.1%	25.0%	7.1%	
Total hours/week spent at facility n (%)					
Less than 5 hours	4 (1.2)	3 (1.0)		1 (7.1)	
5-10 hours	25 (7.2)	23 (7.5)	2 (10.0)		
10-15 hours	12 (3.5)	11 (3.6)		1 (7.1)	
15-20 hours	11 (3.2)	11 (3.6)			
20-25 hours	17 (4.9)	15 (4.9)	2 (10.0)		
25-30 hours	20 (5.8)	18 (5.9)	1 (5.0)		1 (16.7)
30-35 hours	27 (7.8)	23 (7.5)	2 (10.0)	1 (7.1)	1 (16.7)
35-40 hours	83 (24.0)	73 (23.9)	3 (15.0)	5 (35.7)	2 (33.3)
More than 40 hours	100 (28.9)	88 (28.8)	7 (35.0)	5 (35.7)	
No Response	47 (13.6)	41 (13.4)	3 (15.0)	1 (7.1)	2 (33.3)
Patient Primary Source of Payment					
Mean % (SD)					
Medicare	33.1 (27.3)	33.1 (28.3)	30.0 (21.0)	34.4 (16.4)	50 (35.3)
Tricare/VA/IHS	15.5 (25.7)	16.5 (27.0)	8.9 (6.6)	6.5 (3.1)	5
Self-Pay	11.9 (16.7)	12.3 (17.4)	11.0 (14.8)	8.4 (6.3)	-
Other	43.4 (40.9)	42.4 (40.4)	0 (0)	51 (69.2)	60 (56.5)

Table A2.9 Nurse practitioner response summary on influences for selecting practice location.

Influence on decision to accept current primary position	Overall Mean(Median)	Urban	Large rural town	Small rural town	Isolated small rural town
1=Not influential 2=Least influential 3=Somewhat influential 4=Most influential 5=Extremely influential					
Location	3.6 (4)	3.5 (3)	3.9 (4)	3.9 (4)	3.8 (4)
Salary	3.8 (4)	3.8 (4)	3.5 (3)	4.4 (5)	3.5 (3)
Benefits	3.5 (3)	3.5 (4)	3.2 (3)	3.1 (3)	4 (4)
Job Description	4.1 (4)	4.1 (4)	3.8 (4)	4 (4.5)	4 (4)
Other	3.1 (4)				

Table A2.10 Nurse practitioner response summary on future work plans.

In how many years do you plan to do the following? % (n)	Overall	Urban	Large rural town	Small rural town	Isolated small rural town
Retire					
<1 year	2.3 (8)	2.0 (6)	10.0 (2)	0 (0)	0 (0)
1-2 years	1.5 (5)	1.6 (5)	0 (0)	0 (0)	0 (0)
3-5 years	7.8 (27)	8.2 (25)	5.0 (1)	0 (0)	16.7 (1)
6-10 years	13.6 (47)	14.1 (43)	10.0 (2)	14.3 (2)	0 (0)
>10 years	39.6 (137)	39.9 (122)	30.0 (6)	50.0 (7)	33.3 (2)
No plans/Do not know	23.7 (82)	22.9 (70)	30.0 (6)	35.7 (5)	16.7 (1)
No response	11.6 (40)	11.4 (35)	15.0 (3)	0 (0)	33.3 (2)
Significantly Reduce Patient Hours					
<1 year	3.5 (12)	3.3 (10)	10.0 (2)	0 (0)	0 (0)
1-2 years	4.3 (15)	4.3 (13)	5.0 (1)	0 (0)	16.7 (1)
3-5 years	12.7 (44)	13.1 (40)	5.0 (1)	21.4 (3)	0 (0)

In how many years do you plan to do the following? % (n)	Overall	Urban	Large rural town	Small rural town	Isolated small rural town
6-10 years	14.5 (50)	14.7 (45)	25.0 (5)	0 (0)	0 (0)
>10 years	18.5 (64)	17.3 (53)	15.0 (3)	50.0 (7)	16.7 (1)
No plans/Do not know	32.7 (113)	34.3 (105)	20.0 (4)	25.6 (4)	0 (0)
No response	13.9 (48)	13.1 (40)	20.0 (4)	0 (0)	0 (0)
Move practice to another geographical location in AZ					
<1 year	1.7 (6)	1.9 (6)	0 (0)	0 (0)	0 (0)
1-2 years	2.0 (7)	2.2 (7)	0 (0)	0 (0)	0 (0)
3-5 years	3.7 (13)	3.9 (12)	0 (0)	7.1 (1)	0 (0)
6-10 years	1.7 (6)	1.6 (5)	0 (0)	7.1 (1)	0 (0)
>10 years	1.4 (5)	1.3 (4)	5.0 (1)	0 (0)	0 (0)
No plans/Do not know	74.2 (257)	75.4 (228)	75.0 (15)	85.7 (12)	33.3 (2)
No Response	15.0 (52)	14.3 (44)	20.0 (4)	0 (0)	66.6 (4)
Move practice location outside AZ					
<1 year	2.6 (9)	2.2 (7)	5.0 (1)	1 (7.1)	0 (0)
1-2 years	2.3 (8)	2.6 (8)	0 (0)	0 (0)	0 (0)
3-5 years	6.3 (22)	6.2 (19)	0 (0)	21.4 (3)	0 (0)
6-10 years	1.1 (4)	1.3 (4)	0 (0)	0 (0)	0 (0)
>10 years	2.0 (7)	1.9 (6)	5.0 (1)	0 (0)	0 (0)
No plans/Do not know	69.9 (242)	70.5 (216)	70.0 (14)	71.4 (10)	33.3 (2)
No response	15.6 (54)	15.0 (46)	20.0 (4)	0 (0)	66.6 (4)

In how many years do you plan to do the following? % (n)	Overall	Urban	Large rural town	Small rural town	Isolated small rural town
Close Practice					
<1 year	0.8 (3)	0.3 (1)	10.0 (2)	0 (0)	0 (0)
1-2 years	0.2 (1)	0.3 (1)	0 (0)	0 (0)	0 (0)
3-5 years	1.1 (4)	1.3 (4)	0 (0)	0 (0)	0 (0)
6-10 years	0.2 (1)	0.3 (1)	0 (0)	0 (0)	0 (0)
>10 years	0.8 (3)	0.9 (3)	0 (0)	0 (0)	0 (0)
No plans/Do not know	77.1 (267)	77.4 (237)	70.0 (14)	100.0 (14)	33.3 (2)
No response	19.3 (67)	19.2 (59)	20.0 (4)	0 (0)	66.6 (4)

Table A2.11 Nurse practitioner response summary on factors influencing future work plans.

If you plan on retiring, significantly reducing patient hours, moving your practice or closing your practice rank from 1 to 6 in order of importance, with 1 being the most important and 6 being least important, the factors that led to this decision.

Factors that led to decision	Overall Mean(Median)	Urban	Large rural town	Small rural town	Isolated small rural town
	1=Most Important 6=Least Important				
Age	2.6 (2)	2.6 (2)	3 (2.5)	2.5 (1)	4.3 (6)
Lack of job satisfaction	3.1 (3)	3.1 (3)	4.1 (5)	3.4 (3)	2.6 (2)
Speed/rate of reimbursement	4.4 (5)	4.4 (5)	4.1 (4)	4.8 (5)	3 (3)
Health	3.3 (3)	3.3 (3)	2.5 (3)	4 (4)	4.5 (4.5)
Increasing administrative/regulatory burden	3.2 (3)	3.2 (3)	2.75 (2.5)	3.5 (3)	3.6 (4)
Practice	3.7 (4)	3.7 (4)	4 (4.5)	2.5 (2)	3.6 (4)
Other	3.4 (3)	3.5 (3.5)	2.5 (2.5)	3 (2.5)	0 (0)

Table A2.12 Nurse practitioner response summary on Medicare/Medicaid acceptance and practice ownership.

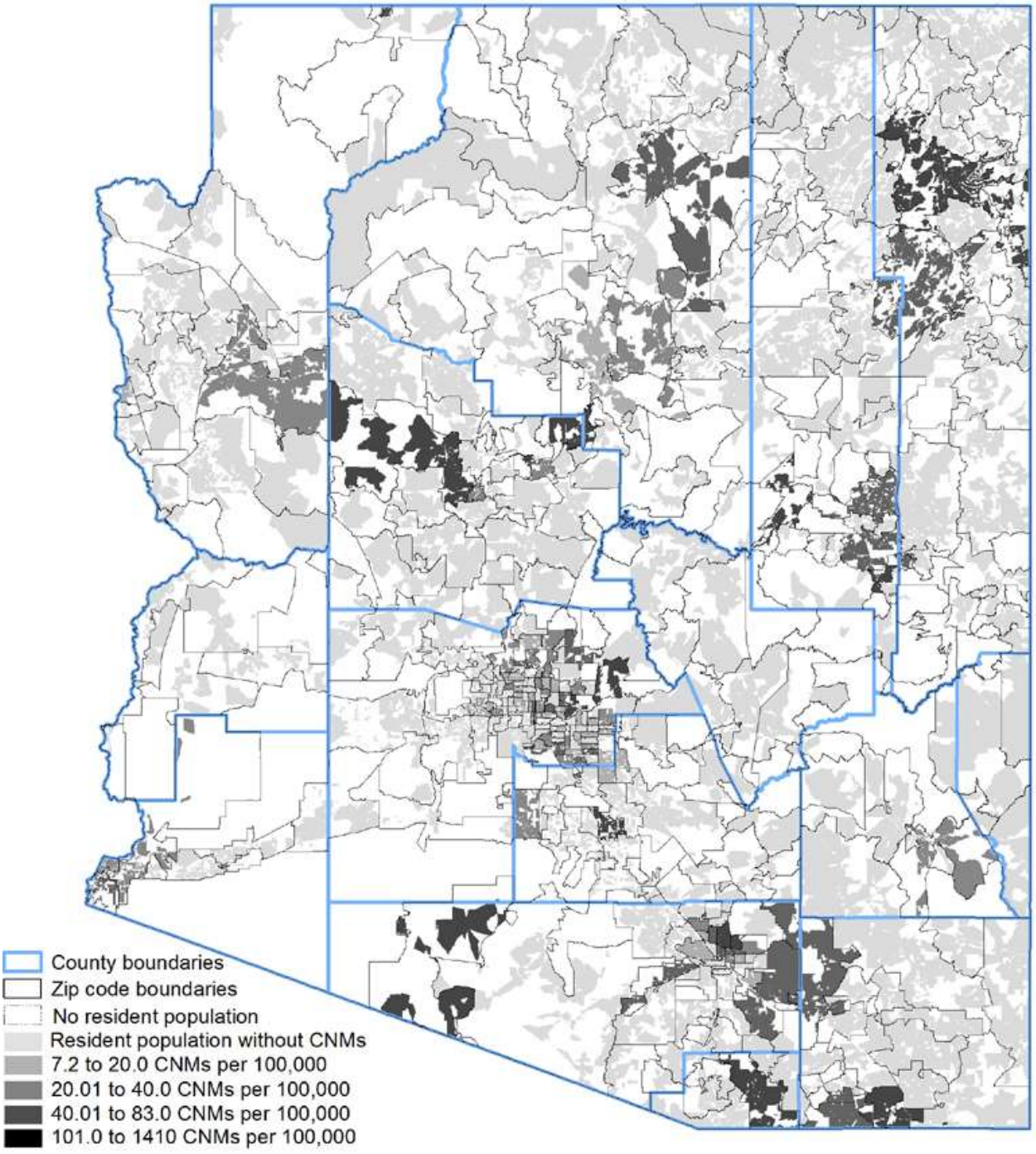
Practice Questions	Overall %	Urban	Large rural town	Small rural town	Isolated small rural town
Currently accepting Medicare/Medicaid patients					
Both Medicare/Medicaid	53.7	51.9	70.0	71.4	50.0
Medicaid Only	6.6	6.8	5.0	7.1	0
Medicare Only	10.9	11.4	5.0	14.2	0
Neither	15.6	16.9	5.0	0	16.6
No response	13.0	12.7	15.0	7.1	33.3
If no, why not?					
Reimbursement rates too low	4.3	4.2	5.0	7.1	0
Practice is at maximum capacity	2.0	2.2	0	0	0
No new members available	0	0	0	0	0
Other	18.7	11.9	23.0	9.0	0
Currently practice on your own					
Full ownership	4.3	3.5	15.0	7.1	0
Part ownership	1.4	1.3	0	7.1	0
No ownership	79.4	81.0	70.0	78.5	33.3
No response	14.7	14.0	15.0	7.1	66.6

A2.3 Certified Nurse Midwife data

Table A2.13 Respondent characteristics of certified nurse midwife survey.

Characteristic	Overall n=42	Urban	Large rural town	Small rural town	Isolated small rural town
Licensed CNMs (active)	28 (27)	36	3	3	0
Licensed obtained in AZ	30 (71.4%)	26	2	2	0
Employed as CNM	29 (70.7%)				
Age in years Mean (SD)	52.9 (11.4)	52.8 (11.2)	57.6 (17.0)	47 (11.3)	-
Female	100%				
Ethnicity n (%)					
Alaskan Native/Native American	1 (2.3)	1 (2.7)			
Asian or Pacific Islander	0 (0)	0 (0)			
Black/African American (non-Hispanic)	0 (0)	0 (0)			
Hispanic/Latino	0 (0)	0 (0)			
White (non-Hispanic)	40 (95.2)	35 (97.2)	3 (100.0)	2 (100.0)	
Other	0 (0)	0 (0)			

Map A2.5 Population coverage by certified nurse midwives in areas with residential populations (US Census 2010).



Map A2.6 Certified nurse midwife survey response rate in areas with residential populations (US Census 2010).

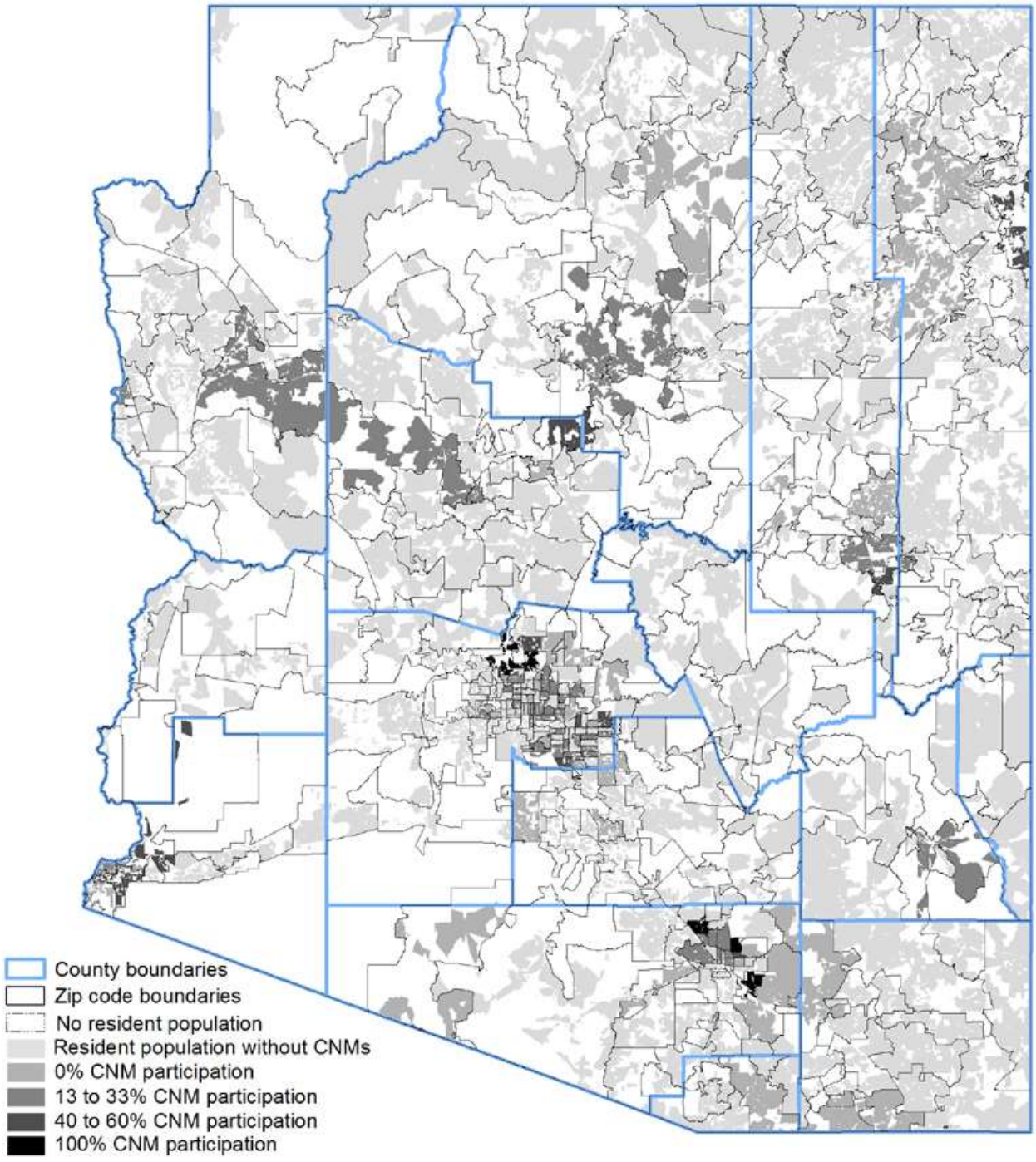


Table A2.14 Certified nurse midwife response summary on practice type, hours of work, and payment source.

Primary Work Setting % (n)	Overall	Urban	Large rural town	Small rural town	Isolated small rural town
Practice Type					
Primary Care	54.7 (23)	55.5 (20)	66.6 (2)	33.3 (1)	-
Specialty	11.9 (5)	11.1 (4)	0 (0)	33.3 (1)	-
Total hours/week spent at facility					
Less than 5 hours	0 (0)	0 (0)	0 (0)	0 (0)	-
5-10 hours	2.3 (1)	2.7 (1)	0 (0)	0 (0)	-
10-15 hours	0 (0)	0 (0)	0 (0)	0 (0)	-
15-20 hours	4.7 (2)	5.5 (2)	0 (0)	0 (0)	-
20-25 hours	0 (0)	0 (0)	0 (0)	0 (0)	-
25-30 hours	11.9 (5)	11.1 (4)	0 (0)	33.3 (1)	-
30-35 hours	2.3 (1)	2.7 (1)	0 (0)	0 (0)	-
35-40 hours	19.0 (8)	16.6 (6)	66.6 (2)	0 (0)	-
More than 40 hours	23.8 (10)	25.0 (9)	0 (0)	33.3 (1)	-
No Response	35.7 (15)	36.1 (13)	33.3 (1)	0 (0)	-
Patient Primary Source of Payment					
Mean % (SD)					
Medicare	16.2 (25.1)	14.5 (25.0)	26.5 (33.2)	0 (0)	-
Tricare/VA/IHS	13.2 (22.1)	13.8 (22.7)	3	0 (0)	-
Self-Pay	14.4 (22)	13.1 (22.1)	25 (32.5)	20	-
Other	48.7 (18.8)	48.7 (48.8)	0 (0)	0 (0)	-

Table A2.15 Certified nurse midwife response summary on influences for selecting practice location.

Influence on decision to accept current primary position	Overall Mean (Median)	Urban	Large rural town	Small rural town	Isolated small rural town
1=Not influential 2=Least influential 3=Somewhat influential 4=Most influential 5=Extremely influential					
Location	4.2 (4.5)	4.2 (5)	4.5 (4.5)	3.5 (3.5)	-
Salary	3.5 (3)	3.6 (3)	4 (4)	2 (2)	-
Benefits	3.1 (3)	3.3 (3)	2 (2)	2 (2)	-
Job Description	3.8 (4)	4.0 (4)	2.5 (2.5)	2.5 (2.5)	-
Other	2.8 (4)	2.3 (2)	4 (4)	4 (4)	-

Table A2.16 Certified nurse midwife response summary on future work plans.

In how many years do you plan to do the following? % (n)	Overall	Urban	Large rural town	Small rural town	Isolated small rural town
Retire					
<1 year	2.3 (1)	2.7 (1)	0 (0)	0 (0)	-
1-2 years	11.9 (5)	11.1 (4)	33.3 (1)	0 (0)	-
3-5 years	4.76 (2)	5.5 (2)	0 (0)	0 (0)	-
6-10 years	4.76 (2)	5.5 (2)	0 (0)	0 (0)	-
>10 years	16.6 (7)	19.4 (7)	0 (0)	0 (0)	-
No plans/Do not know	26.1 (11)	22.2 (8)	33.3 (1)	66.6 (2)	-
No response	33.3 (14)	33.3 (12)	33.3 (1)	33.3 (1)	-
Significantly Reduce Patient Hours					
<1 year	0 (0)	0 (0)	0 (0)	0 (0)	-
1-2 years	4.7 (2)	2.7 (1)	1 (33.3)	0 (0)	-
3-5 years	0 (0)	0 (0)	0 (0)	0 (0)	-

In how many years do you plan to do the following? % (n)	Overall	Urban	Large rural town	Small rural town	Isolated small rural town
6-10 years	7.1 (3)	8.3 (3)	0 (0)	0 (0)	-
>10 years	11.9 (5)	13.8 (5)	0 (0)	0 (0)	-
No plans/Do not know	38.1 (16)	36.1 (13)	33.3 (1)	66.6 (2)	-
No response	38.1 (16)	38.8 (14)	33.3 (1)	33.3 (1)	-
Move practice to another geographical location in AZ					
<1 year	0 (0)	0 (0)	0 (0)	0 (0)	-
1-2 years	1 (2.3)	0 (0)	0 (0)	33.3 (1)	-
3-5 years	0 (0)	0 (0)	0 (0)	0 (0)	-
6-10 years	0 (0)	0 (0)	0 (0)	0 (0)	-
>10 years	1 (2.3)	1 (2.7)	0 (0)	0 (0)	-
No plans/Do not know	24 (57.1)	21 (58.3)	2 (66.6)	33.3 (1)	-
No response	16 (38.1)	14 (38.8)	33.3 (1)	33.3 (1)	-
Move practice location outside AZ					
<1 year	2.3 (1)	2.7 (1)	0 (0)	0 (0)	-
1-2 years	2.3 (1)	0 (0)	0 (0)	33.3 (1)	-
3-5 years	0 (0)	0 (0)	0 (0)	0 (0)	-
6-10 years	0 (0)	0 (0)	0 (0)	0 (0)	-
>10 years	2.3 (1)	2.7 (1)	0 (0)	0 (0)	-
No plans/Do not know	54.7 (23)	55.5 (20)	66.6 (2)	33.3 (1)	-
No response	38.1 (16)	38.8 (14)	33.3 (1)	33.3 (1)	-

In how many years do you plan to do the following? % (n)	Overall	Urban	Large rural town	Small rural town	Isolated small rural town
Close Practice					
<1 year	0 (0)	0 (0)	0 (0)	0 (0)	-
1-2 years	0 (0)	0 (0)	0 (0)	0 (0)	-
3-5 years	0 (0)	0 (0)	0 (0)	0 (0)	-
6-10 years	0 (0)	0 (0)	0 (0)	0 (0)	-
>10 years	0 (0)	0 (0)	0 (0)	0 (0)	-
No plans/Do not know	61.9 (26)	61.1 (22)	66.6 (2)	66.6 (2)	-
No response	38.1 (16)	38.8 (14)	33.3 (1)	33.3 (1)	-

Table A2.17 Certified nurse midwife response summary on factors influencing future work plans.

If you plan on retiring, significantly reducing patient hours, moving your practice or closing your practice rank from 1 to 6 in order of importance, with 1 being the most important and 6 being least important, the factors that led to this decision.

Factors that led to decision	Overall Mean(Median)	Urban	Large rural town	Small rural town	Isolated small rural town
	1=Most Important 6=Least Important				
Age	2.0 (1)	1.7 (1)	2	6	-
Lack of job satisfaction	3.3 (3)	3.5 (3.5)	3	3 (3)	-
Speed/rate of reimbursement	5.2 (5.5)	5.5 (6)	-	2	-
Health	3.3 (3.5)	3.1 (3)	5	4	-
Increasing administrative/regulatory burden	3.1 (3)	3.2 (3)	4	1	-
Practice	3.5 (4)	4 (4)	1	3	-
Other	3.6 (4)	2.5 (2.5)	6	-	-

Table A2.18 Certified nurse midwife response summary on Medicare/Medicaid acceptance and practice ownership.

Practice Questions	Overall %	Urban	Large rural town	Small rural town	Isolated small rural town
Currently accepting Medicare/Medicaid patients					
Both Medicare/Medicaid	50.0	50.0	66.6	33.3	-
Medicaid Only	7.1	8.3	0.0	0.0	-
Medicare Only	4.7	2.7	0.0	33.3	-
Neither	4.7	5.5	0.0	0.0	-
No response	33.3	33.3	33.3	33.3	-
If no, why not?					
Reimbursement rates too low	4.7	5.5	0.0	0.0	-
Practice is at maximum capacity	0.0	0.0	0.0	0.0	-
No new members available	0.0	0.0	0.0	0.0	-
Other	9.5	8.3	0.0	33.3	-