Baseline Health Workforce Landscape – Providers

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Introduction

Providers are the backbone of the health care delivery system. This draft baseline assessment looks at the geographic distribution of select provider organizations in Oklahoma in order to provide insight regarding workforce adequacy and distribution. The assessment is organized into five sections based on the type of provider. Section one, ***Physicians***, looks at both allopathic and osteopathic physicians in the state with a focus on primary care providers. The second section, ***Nurses***, focuses on licensed nursing workforce in one of three professional categories: registered nurses, advanced practice registered nurses, and licensed practical nurses. Section three, ***Physician Assistants***, focuses on the trained and licensed individuals who practice as part of a team of health care providers and function under the supervision of physician. ***Dentists*** and ***Psychologists*** are addressed in sections four and five, respectively.

Methodology

The Oklahoma State Department of Health (OSDH) supplied the data used to complete this draft baseline assessment. OSDH acquired the data from the appropriate state licensing agencies, except for dentists, which were obtained from the National Provider Identifier (NPI) database. The data was supplied in seven Microsoft Excel Workbooks, with each profession stored in a separate workbook. The data required substantial preprocess with Google Refine to standardize the postal addresses that were used for geocoding. ESRI's ArcGIS v10.2 for Desktop and ArcGIS World Geocode Service were used to geocode the addresses. For all professions combined, 58,938 address records were geocoded with 49,584 records matched at the street address or point address level. The remaining 9,354 records were matched to the appropriate city, ZIP code, or street name. Thirty-five records did not contain enough information to geocode and were eliminated from further analysis.

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1. Physicians

Oklahoma is home to 7,839 active physicians (or 20.4 physicians/10,000 population). An additional 446 physicians are currently completing their graduate medical education (or residency training) in the state. Osteopathic physicians (DOs) comprise 26% (1,618) of the active physician workforce with allopathic physicians (MDs) filling the remaining 74% (6,221). Around 46% (3,618 or 9.4 physicians/10,000 population) of the active physicians in the state practice in one of the primary care specialties (family medicine/general practice; internal medicine; obstetrics & gynecology; and pediatrics). Table 1 shows that family medicine/general practice is the most prevalent primary care specialty choice followed by internal medicine, pediatrics, and obstetrics and gynecology. Oklahoma has one of the lowest primary care physician to population ratios in the country. The United Health Foundation ranked Oklahoma 48th in access the primary care physicians in their 2015 edition of *America's Health Rankings*.[1] It is well documented that populations who have greater access to primary care physicians generally live longer, healthier lives.[2]

Primary Care Specialty	Active Physicians
Family Medicine/General Practice	1,680
Internal Medicine	1,064
Obstetrics & Gynecology	384
Pediatrics	490

Table 1. Primary Care Specialty Choice Among Active Physicians (MD & DO) in Oklahoma, 2014

The primary care specialties represent three of the top five specialty choices among active physicians in the state. Only emergency medicine with 443 active physicians and anesthesiology (440) outrank any one of the primary care specialties. Table 2 lists top ten specialty choices among active physicians in the state.

Specialty	Active Physicians
Family Medicine/General Practice	1,680
Internal Medicine	1,064
Pediatrics	490
Emergency Medicine	443
Anesthesiology	440
Obstetrics & Gynecology	384
Psychiatry	315
Diagnostic Radiology/Radiology	311
General Surgery	293
Orthopedic Surgery	268

Table 2. Top Ten Specialty Choices Among Active Physicians (MD & DO) in Oklahoma, 2014

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[1] America's Health Rankings (2015, May 10). Retrieved from http://www.americashealthrankings.org/OK

[2] Starfield, B., Shi, L., & Macinko, J. (2005). Contribution of Primary Care to Health Systems and Health. *The Milbank Quarterly*. 83(3): 47-502.

A complete demographic analysis of Oklahoma's physician workforce is limited by the lack of data. The physician dataset provided did not contain racial/ethnic data for physicians. Second, age and gender data were available only for allopathic physicians. The average age of active allopathic physicians is 55 years old. As Table 3 shows, allopathic physicians born in the 1950s are the largest cohort and closely followed by those born in the 1960s. While close to 75% of the active allopathic physician workforce is male, the number of female physicians entering the workforce is increasing.[3] And, like national trends, younger female allopathic physicians in Oklahoma are opting to enter one of the primary care specialties. The lack of age and gender data for the osteopathic physicians precludes a complete understanding of the true demographic composition of Oklahoma's physician workforce.

Decade of Birth	Active Physicians	Male	Female	Active Primary Care Physicians	Male	Female
Prior to 1920	1	1	0	1	1	0
1920s	48	46	2	25	25	0
1930s	289	271	18	112	100	12
1940s	925	819	106	340	298	42
1950s	1,685	1,299	386	692	497	195
1960s	1,544	1,122	422	677	432	245
1970s	1,397	899	498	681	383	298
1980s	332	181	151	217	111	106

Table 3. Birth Cohorts for Active Allopathic (MD) Physicians in Oklahoma, 2014

The geography of the active physician workforce in Oklahoma is one of maldistribution. Every county in the state, except for Grant County, is home to at least one active physician. Over 5,200 physicians practice in Oklahoma County (3,011) and Tulsa County (2,258). At the other extreme, two counties, Dewey and Harmon, only have one active physician each (see Figure 1 & Figure 2). Thirty-three counties have 10 or fewer active physicians.

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[3] Hedden, L., Barer, M.L., Cardiff, K., McGrail, K.M., Law, M.R., & Bourgeaut, I.L. (2014). The implications of the feminization of the primary care physician workforce on service supply: a systematic review. *Human Resources for Health*. 12: 32.

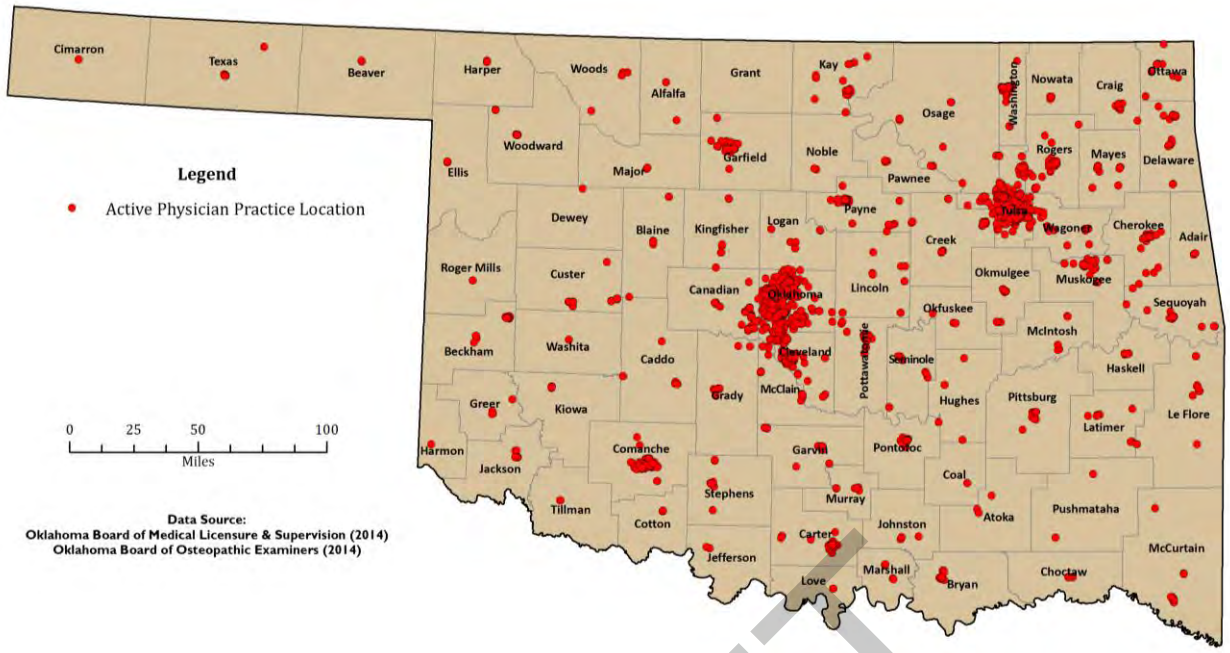

Figure 1. Active Physician (MD & DO) Practice Locations in Oklahoma, 2014

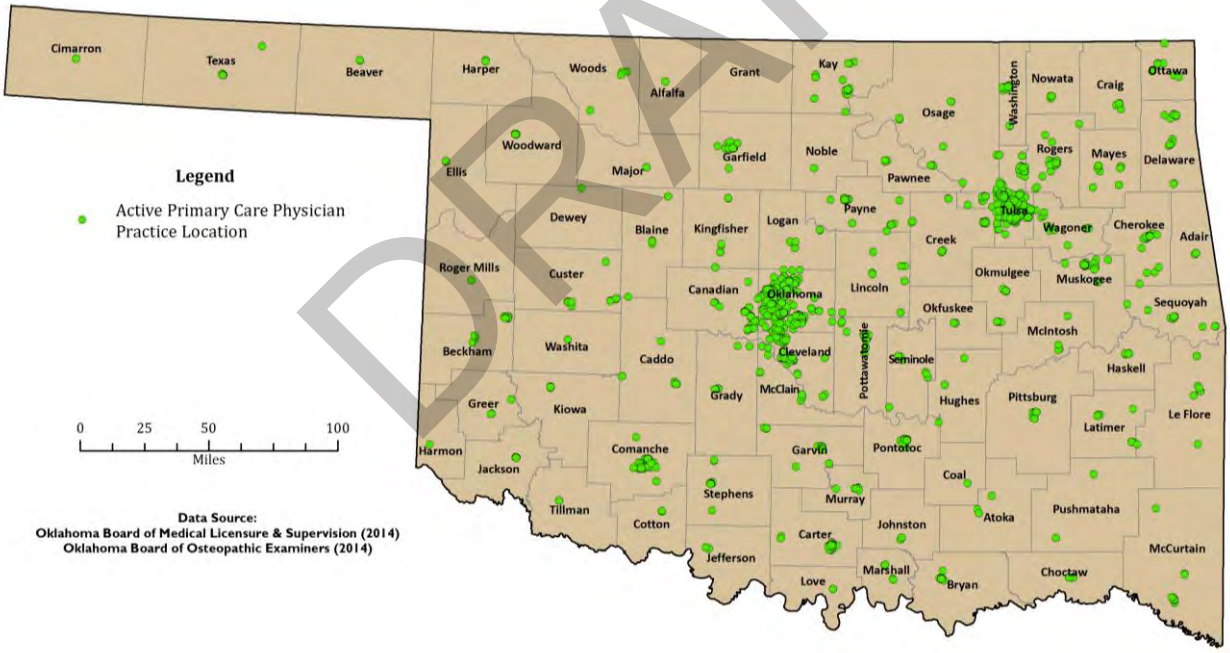

Figure 2. Active Primary Care Physician (MD & DO) Practice Locations in Oklahoma, 2014

Much of this maldistribution falls along the rural/urban divide. Using the county-level rural/urban classification system developed by the OSU Center for Rural Health, the number of active physicians in rural Oklahoma totals 1,731 (or 11.4 physicians/10,000 population). Urban Oklahoma is home to 6,108 active physicians (26.3/10,000 population). Further, for primary care, rural Oklahoma has 1,023 (6.7 physicians/10,000 population) active primary care

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physicians versus 2,595 (11.2 physicians/10,000 population) active primary care physicians in urban Oklahoma. Table 4 summarizes the distribution of the active physician workforce across metropolitan statistical areas (MSA) in Oklahoma. MSAs are geographic areas defined by a core urban area with population of 50,000 or more, the county containing the urban core, and adjacent counties that have a high level of commuting to the urban core for work. Close to 80% of all active physicians and over 74% of primary care physicians practice in a MSA.

Metropolitan Statistical Areas (MSA)	Active Physicians (Rate/10,000 Population)	Active Primary Care Physicians (Rate/10,000 Population)
Oklahoma City MSA	3,468 (26.3)	1,383 (10.5)
Tulsa MSA	2,464 (25.6)	1,147 (11.9)
Lawton MSA	245 (18.7)	116 (8.8)
Ft. Smith, Ark. MSA	53 (5.8)	38 (4.2)
Remainder of the State	1,609 (11.9)	934 (6.9)

Table 4. Distribution of Active Physicians (MD & DO) Practice Locations by MSAs in Oklahoma, 2014

Rural Urban Commuting Areas (RUCA) are often used in health services research to classify urban and rural areas. RUCAs are based on Census tract-level commuting patterns that are the result of economic relationships between rural areas and urban areas. Because of their relatively small geographic scale, and that they are subdivided into 33 different categories, RUCAs provide a level of detail that is not apparent in larger scale geographies such as counties. To facilitate interpretation, the 33 different RUCA categories can be combined into logical groupings. Table 5 shows the distribution of active physicians in Oklahoma across four different categories based on the Census tract associated with each physicians practice location. The per capita rates across all four categories mimics those presented above for rural and urban Oklahoma. The dearth of physicians in rural Oklahoma is particularly acute in the state's small rural towns and isolated rural towns.

Category	Active Physicians (Rate/10,000 Population)	Active Primary Care Physicians (Rate/10,000 Population)
Urban	6,571 (24.7)	2,281 (8.3)
Large Rural City/Town	931 (16.6)	487 (8.7)
Small Rural Town	238 (9.0)	164 (6.2)
Isolated Small Rural Town	99 (5.1)	86 (4.4)

Table 5. Active Physicians (MD & DO) in Oklahoma by categorized RUCAs, 2014

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2. *Nurses*

The nursing workforce in Oklahoma is divided into three distinct licensed groups: registered nurses (RN); licensed practical nurses (LPN); and advanced practice registered nurses (APRN) (a/k/a nurse practitioners). The Oklahoma Board of Nursing licenses all of the aforementioned nursing professionals. And, like the physician data, these data reflect all licensed individuals and may not reflect the number or distribution of nurses involved in direct patient care. The licensed nursing workforce in Oklahoma totals 47,167 (see Table 6).

License Type	Total Licensed
Registered Nurse	32,351
Licensed Practical Nurse	12,814
Advanced Practice Registered Nurses	2,002

Table 6. Licensed Nurses in Oklahoma by Type, 2014

2.1. Registered Nurses

RNs account for 69% of all licensed nurses in the state. Almost 60% of the RNs work in Oklahoma County (11,379) and Tulsa County (7,814). The seven RNs practicing in Roger Mills County are the fewest in any one county (see Figure 3). Practice location information was not available for 22 RNs.

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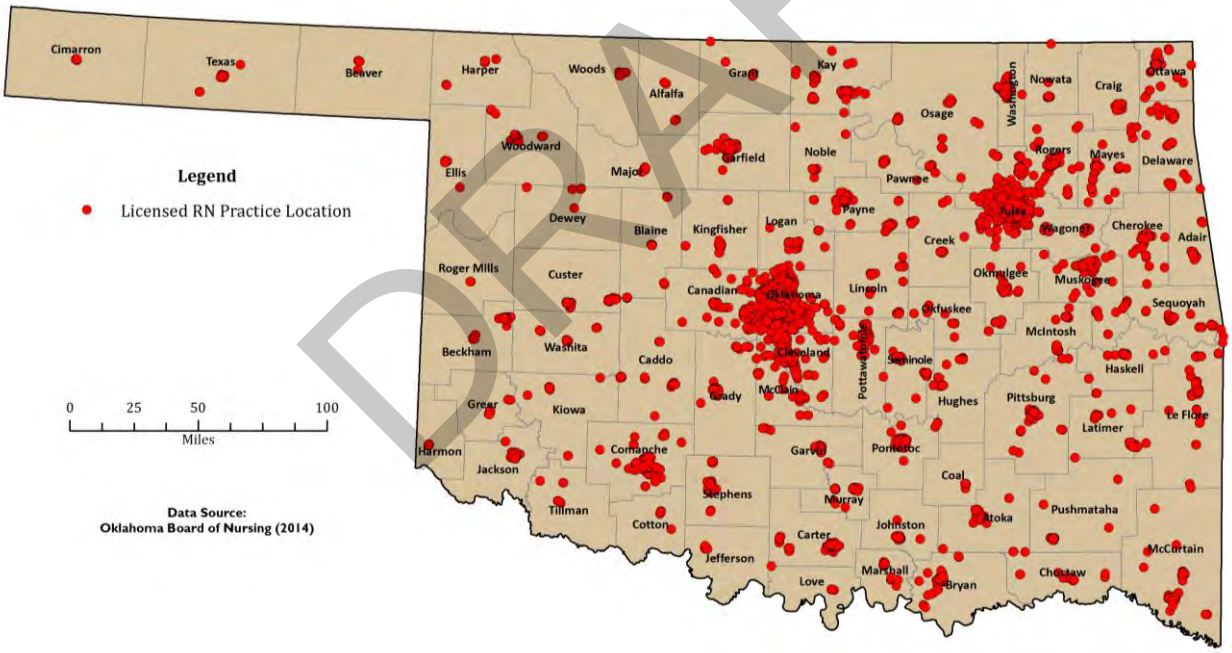

Figure 3. Licensed Registered Nurse Practice Locations in Oklahoma, 2014

Almost 64% of all RNs practice in a hospital setting (see Table 7). The second most popular practice setting for RNs are home health agencies.

Practice Setting	Number of Licensed RNs
Hospital	20,557
Home Health	2,668
Other	2,558
Long-term/Extended Care	1,707
Ambulatory Care Setting	1,521
Academic Setting	891
Community Health	820
Public Health	481
School Health	397
Insurance/Utilization Review	249

Table 7. Top ten practice settings among licensed RNs in Oklahoma, 2014

The geographic distribution of RNs is skewed to the state's urban areas. Over 71% (23,008) of RNs practice in an urban county with the remaining 9,343 practicing in a rural county.

2.2. Advanced Practice Registered Nurses

Advanced Practice Registered Nurses (APRN) account for 4% of licensed nurses in Oklahoma. Over half practice in Oklahoma County or Tulsa County. APRNs practice in all but four Oklahoma counties; Cimarron, Harper, Jefferson, and Roger Mills (see Figure 4).

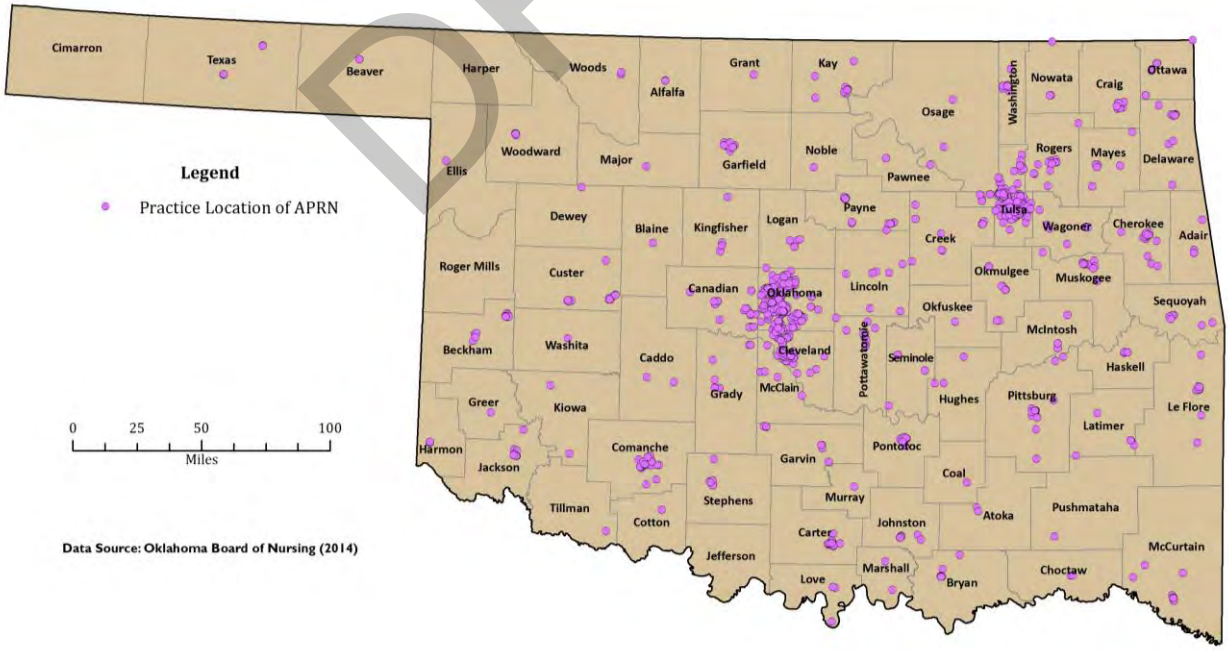

Figure 4. Practice Locations of APRNs in Oklahoma, 2014

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The source data provided contained a variable describing the employment setting of APRNs. Approximately 26% of APRNs practice in a hospital. Table 8 lists the top ten practice settings for APRNs.

Practice Setting	Number of Licensed APRNs
Hospital	861
Ambulatory Care Setting	453
Other	375
Community Health	133
Academic Setting	70
Public Health	34
Long-term/Extended Care	30
Correctional Facility	12
Unknown	13
Home Health	11

Table 8. APRNs by Practice Setting, 2014

The most popular specialty choice among APRNs in Oklahoma is family medicine (834) followed by nurse anesthetist (438). Fifty APRNs are nurse midwives. Like physician assistants, APRNs are becoming an increasing important component of the primary care delivery system. Around 68% (or 1,373) of APRNs in Oklahoma specialize in primary care. APRNs represent 25% of all primary care providers in Oklahoma. Over 35% of primary care APRNs practice in rural Oklahoma.

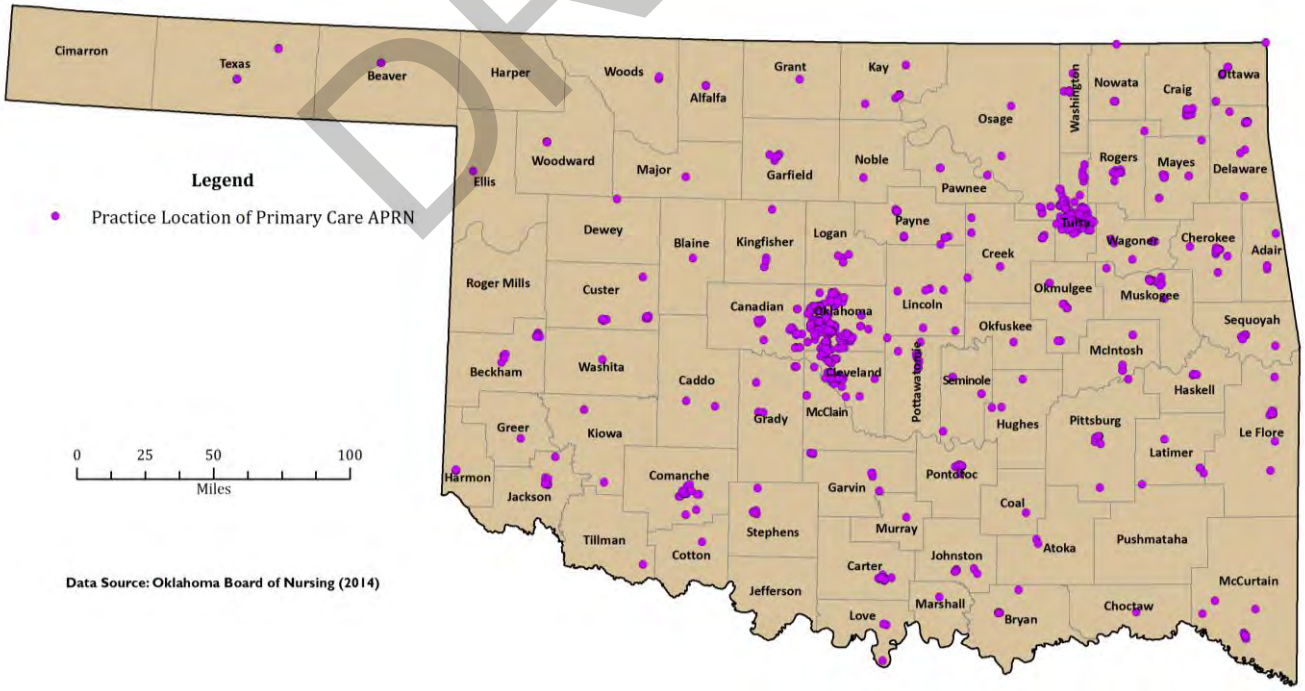

Figure 5. Practice Locations of Primary Care APRNs in Oklahoma, 2014

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2.3. Licensed Practical Nurses

The remaining 27% of the licensed nurses in Oklahoma are LPNs. Of the 12,814 licensed LPNs, nurses were not employed in nursing or had an unknown practice setting. Most of the remaining 12,774 LNPs are concentrated in Oklahoma County (2,581) and Tulsa County (1,926). Cimarron County in the panhandle has the fewest LPNs with only four practicing in the county. **Error! Reference source not found.** shows the distribution of the LPN work force.

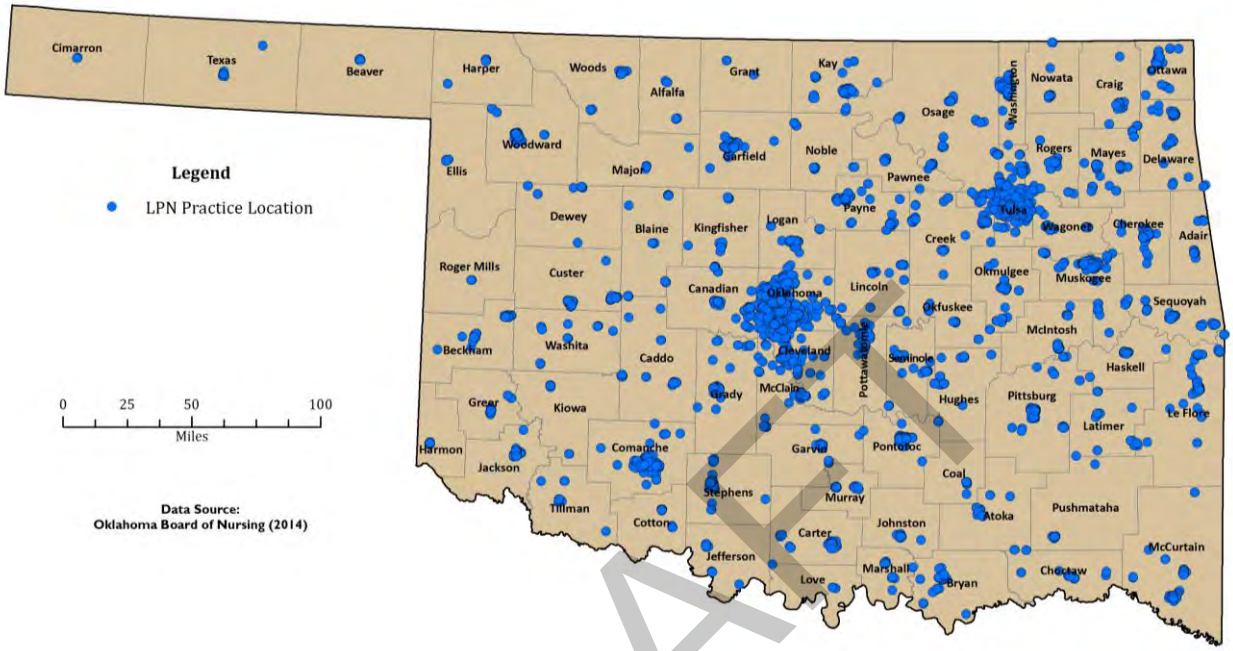

Figure 6. LPN Practice Locations in Oklahoma, 2014

The source data that we were provided contained two variables that described the employment characteristics of LPNs. The practice setting variable describes settings where LPNs practice (see Table). A plurality (32%) of LPNs are employed in long-term/extended care facilities. 21% of LPNs are employed in hospitals.

Practice Setting	Number of LPNs
Long-term/Extended Care	4,086
Hospital	2,721
Other	2,051
Home Health	1,953
Community Health	632
Ambulatory Care	570
Public Health	214
Correctional Facility	167
School Health	122
Occupational Health	96

Table 9. Top ten practice settings for LPNs in Oklahoma, 2014

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In terms of position title, close to 77% of LPNs are classified as a *Staff Nurse*. Table lists all of the position titles for the LPN workforce in Oklahoma.

Position	Number of LPNs
Staff Nurse	9,866
Other	1,686
Nurse Manager	519
Nurse Faculty	403
Nurse Executive	106
Consultant	65
Nurse Researcher	16
Unknown	3

Table 10. Position title for LPNs in Oklahoma, 2014

Interestingly, the hours worked was reported for LPNs. Most LNPs (11,065) work full-time (over 35 hours/week). For the part-time employed nurses, most (1139) worked 20 to 34 hours/week. The remaining 568 worked less than 19 hours/week.

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3. Physician Assistants

Physician assistants (PAs) fill an important role in the delivery of team-based health care. Working under the supervision of a licensed physician, PAs can specialize in a variety of different medical practice areas, including primary care. Oklahoma is home to 1,193 active PAs (see **Error! Reference source not found.**). As with most other health care professions, PA practices are concentrated in Oklahoma County (431) and Tulsa County (223). There are no PAs practicing in 8 counties (Beaver, Cotton, Ellis, Grant, Harmon, Murray, Texas, and Washita). Along the rural/urban continuum, 851 PAs practice in urban areas while the remaining 342 practice in rural Oklahoma.

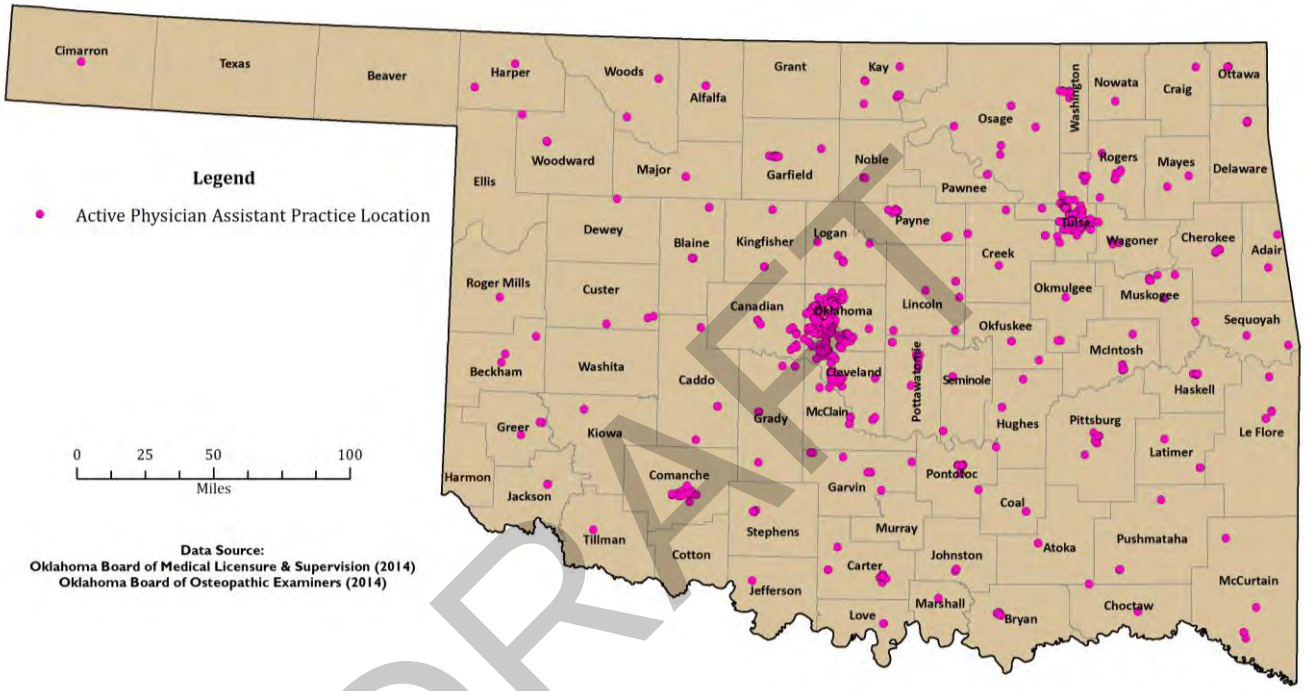

Figure 7. Active PA Practice Locations in Oklahoma, 2014

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The dataset that we were provided did not contain information about specialty choice among the PAs practicing in Oklahoma. However, research conducted by the National Commission on the Certification of Physician Assistants shows that 34.2% of PAs in Oklahoma specialize in one of the primary care disciplines.[4]

[4] 2013 Statistical Profile of Certified Physician Assistants (2015, June 15) Retrieved from https://www.nccpa.net/Upload/PDFs/2013StatisticalProfileofCertifiedPhysicianAssistants-AnAnnualReportoftheNCCPA.pdf

The age and gender characteristics of the PA workforce are depicted in **Error! Reference source not found.**. Females comprise 62% of the PA workforce. Females are the largest portion of every age cohort less than 60 years with the exception of a single female octogenarian PA. The PA workforce is relatively young, as compared to physicians, with an average age of 42 years old.

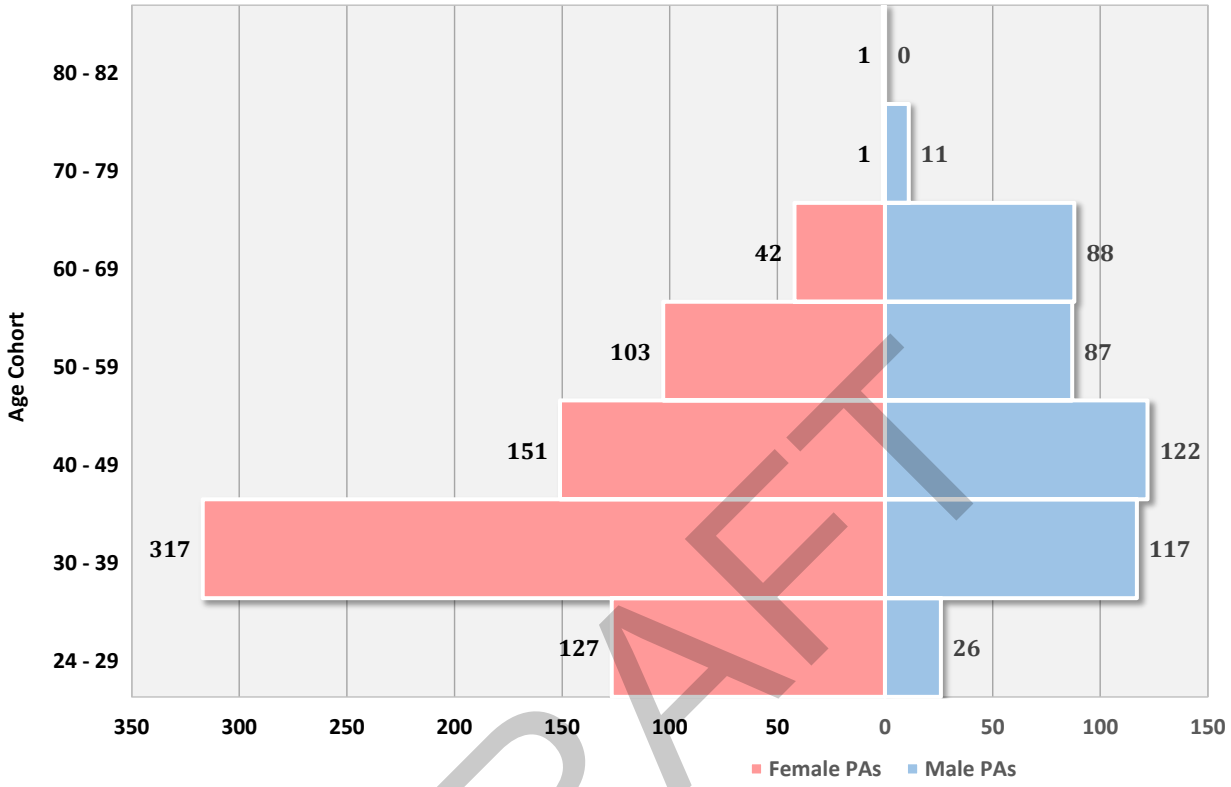

Figure 8. Population Pyramid of Active PA Workforce in Oklahoma, 2014

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4. Dentists

Dentists practice in all but four counties (Cimarron, Cotton, Grant, and Harmon) in Oklahoma. The workforce totals 1,756 licensed dentists. Close to 1,000 dentists practice in Oklahoma County (543), Tulsa County (338), and Cleveland County (118). The remainder are scattered around the state with most located in the larger rural communities (see **Error! Reference source not found.**). As a whole, 552 dentists practice in rural Oklahoma, as defined by the OSU Center for Rural Health, for a rate of 3.6 dentists per 10,000 population. The rate in urban Oklahoma is 5.2 dentists per 10,000 population. Over 78% of licensed dentists are male. Further, only 42 dentists specialize in pediatric dentistry (see **Error! Reference source not found.**)

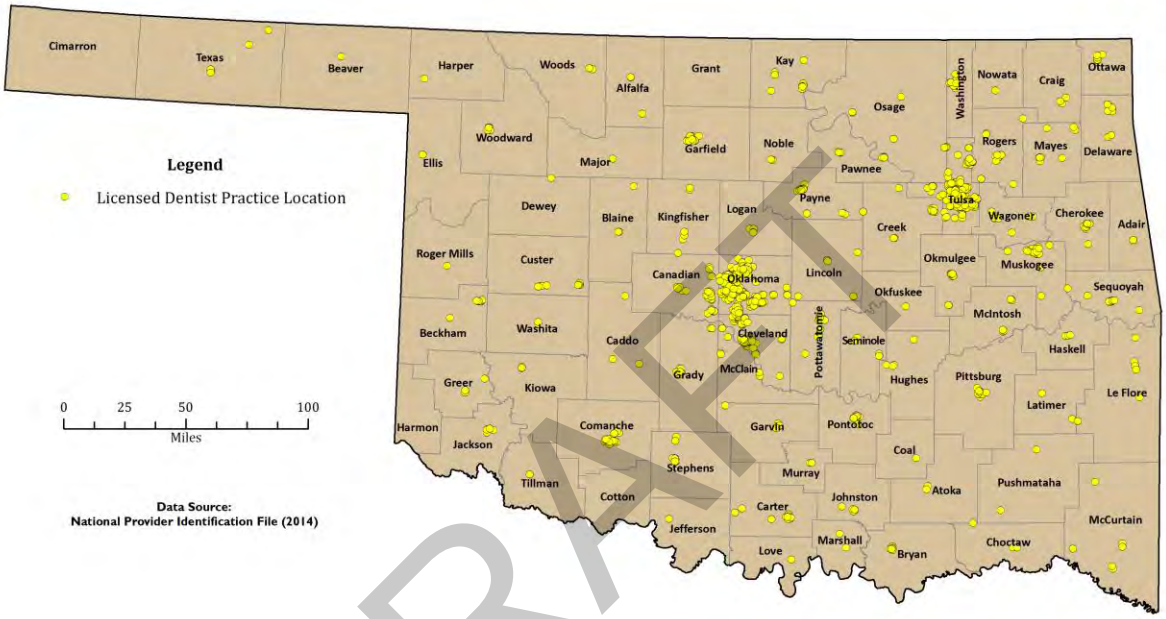

Figure 9. Licensed Dentist Practice Locations in Oklahoma, 2014

Figure 10. Licensed Pediatric Dentist Practice Locations in Oklahoma, 2014

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5. Psychologists

Oklahoma is experiencing a behavioral health care crises.[5] Not only in terms of the number of citizens seeking or needing treatment, but also in terms of workforce capacity. Psychologists are an import part of a well-functioning behavioral health care workforce. Oklahoma is home to 571 licensed psychologists. Over 56% of licensed psychologists practice in Oklahoma County (185) or Tulsa County (136). Licensed psychologists practice in 31 of the state's 77 counties (see **Error! Reference source not found.**).

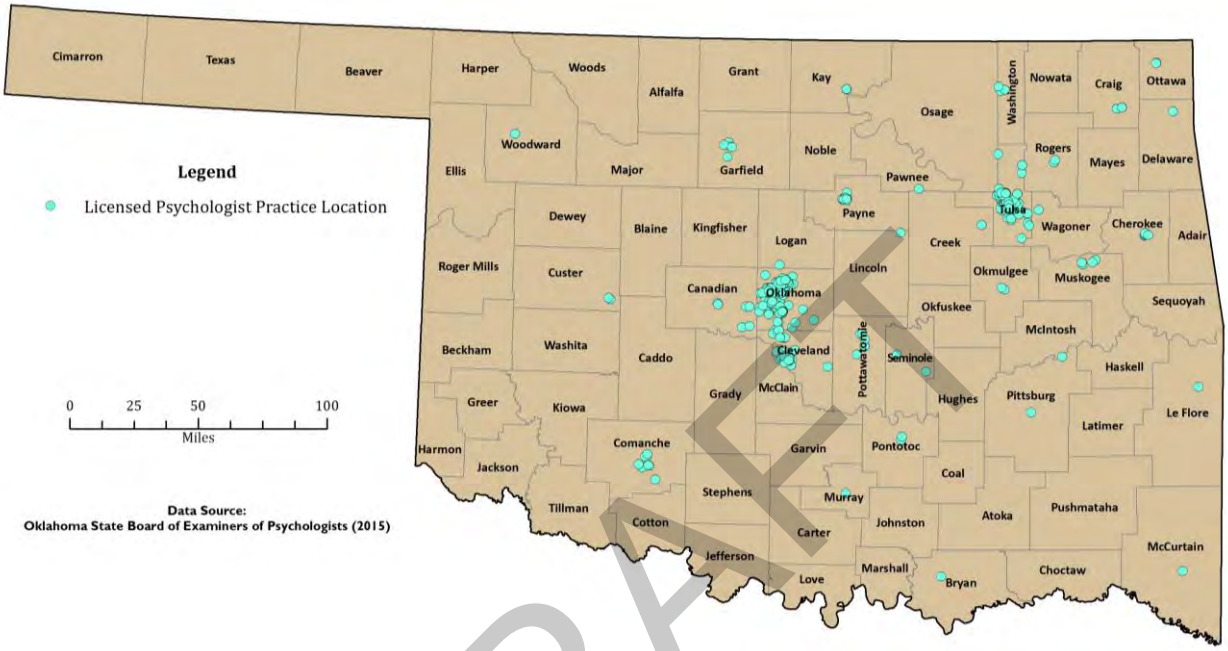

Figure 11. Licensed Psychologist Practice Locations in Oklahoma, 2015

At a more regional scale, only 88 (or 15%) licensed psychologists practice in rural counties as defined by the OSU Center for Rural Health. This translates to a rate of 0.6 licensed psychologists per 10,000 residents (the rate in urban Oklahoma is 2.1 psychologists per 10,000 residents). The actual rate is probably higher than reported above. Telehealth technologies are increasingly used to deliver some behavioral health treatments.[6] It is likely that some psychologists in Oklahoma are delivering treatment via this modality and reaching rural patients. Unfortunately, the licensure data does not capture such events or note if providers offer telehealth services.

With regard to specialty mix, 45% (or 282) of licensed psychologists specialize in clinical psychology and 38% (218) specialize in counseling. Only 36 psychologists specialize in school psychology.

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[5] Healthy Oklahoma 2020 (2015, May 14). Retrieved from http://ohip2020.com/

[6] Novotney, A. (2011). A new emphasis on telehealth: How can psychologists stay ahead of the curve - and keep patients safe? *American Psychological Association*. 42(6): 40.