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The Status of the Nebraska Healthcare Workforce: Update 2020

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The Nebraska Area Health Education Center Program (AHEC) In collaboration with UNMC Office of Academic Affairs, Rural Health Intitiatives and UNMC College of Public Health, Center for Health Policy

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Executive Summary

Rural-urban differences in access to healthcare continue to be an important and difficult policy issue facing communities throughout the State of Nebraska. The 2018 report titled "The Status of the Healthcare Workforce in the State of Nebraska" highlighted both improvements and concerns regarding the distribution of the healthcare workforce throughout the state. There have been dramatic increases in the numbers of nurse professionals and allied health workforce practicing in Nebraska's rural counties over the prior decade, helping to address growing healthcare needs resulting from aging demographic and other factors in the state. However, the prior report also raised concerns that more sparsely populated counties are unlikely to have the population needed to support a healthcare practice and the substantial maldistribution of the healthcare workforce was a challenge, and, for certain specialties such as pediatric care and obstetrics and gynecology, the dichotomy in access to care between rural and urban communities is growing.

This report uses updated data to examine changes in the state's healthcare workforce to assess the relative impact of existing programs, to inform health workforce planning efforts, to inform policy interventions, and to inform the development of new models of healthcare delivery.In the face of significant and transformational change in healthcare delivery and demographic and population distribution changes in Nebraska, increasing unmet healthcare needs in rural areas may manifest as health care inequity and poorer health outcomes in these communities.

Using data from the year 2019 provided by the University of Nebraska Medical Center Health Professions Tracking Service (HPTS) and State of Nebraska licensure data, we examine the following health professions:

- Physicians and Physician Assistants
- Advanced Practice Registered Nurses, Registered Nurses and Licensed Practical Nurses
- Dentists and Dental Hygienists
- Pharmacists and Pharmacy Technicians
- Physical Therapists
- Occupational Therapists
- Emergency Medical Technicians
- Medical Nutrition Therapists
- Respiratory Care Practitioners
- Speech-Language Pathologists
- Audiologists
- Medical Nutrition Therapists
- Medical Radiographers
- Chiropractors
- Podiatrists
- Optometrists

Nebraska behavioral health workforce data and analysis are available through the Behavioral Health Education Center of Nebraska (BHECN) at https://www.unmc.edu/bhecn/.Therefore, behavioral health workforce was not included in this report.

The following are selected key findings from our study:

- The number of active physicians per 100,000 population increased from 253 to 257.7 per 100,000 population in the two-year period from 2017 to 2019
- In 2017, 13 out of 93 counties in Nebraska did not have any primary care physicians. Currently, 14 counties do not have primary care physicians
- Out of 93 counties, only 39 counties have active OB/GYN physicians in 2019 compared to 49 counties in 2017
- There are now 1,335 nurse practitioners (NP) in Nebraska—a 16.3% increase since 2017 when there were 1,148 NPs

- The number of dentists per 100,000 population decreased slightly from 56.5 to 56.2 in two years, but the number of dental hygienists increased from 71.6 to 73.8 per 100,000 population
- The number of practicing pharmacists declined from 2,066 in 2017 to 2,048 in 2019, while the number of pharmacy technicians continues to increase, growing from 3,428 to 3,511
- The number and rates of all types of emergency medical technicians have declined significantly from 6,961 to 6,633, a 4.7% decrease in two years

Healthcare professions are high demand, high skill and high wage (H3) occupations.These professions are critical to the overarching healthcare system as they facilitate access to quality healthcare and have significant impact on Nebraska's health, economy and the sustainability and vibrancy of the state's rural and urban underserved communities.

Based on these 2019 findings, we provide several recommendations to help monitor and address workforce challenges in the State of Nebraska. These recommendations are:

1. Enhance existing pipeline programs and educational initiatives that incentivize individuals from rural and underserved urban areas to become healthcare professionals and practice healthcare in these communities, particularly for health professions exhibiting significant shortages.
2. Enhance the availability of scholarships and student loan repayment programs for health profession students and practitioners at all levels, specifically those interested in serving rural and underserved urban areas, as a means for recruiting and retaining the needed healthcare workforce.
3. Increase the number of medical residency training positions in Nebraska to include significant training in rural and underserved urban areas.
4. Expand the capacity of the telecommunication infrastructure to support the adoption and utilization of telehealth for expanding access to healthcare.
5. Develop innovative healthcare delivery solutions and related policy interventions to mitigate gaps in healthcare access due to health profession shortages as well as support rural training programs like Simulation in Motion – Nebraska (SIM-NE).
6. Perform targeted, ongoing data collection to monitor the healthcare workforce and forecast future needs and requirements.
7. Establish and streamline existing public-private partnerships aimed at health professions education, workforce development and healthcare delivery.

For certain professions such as OB/GYN physicians and EMTs, access to care has deteriorated significantly in only two years, particularly in rural counties. For other health professions, the situation is less critical and continue growth trends over the prior decade. However, it is unclear whether this growth will keep pace with aging demographic change in rural communities. Our data also show that the healthcare workforce continues to shift toward an older age distribution.

Based on these findings, annual reporting of the status of Nebraska's workforce supplemented by forecasting of the state's health needs and anticipated growth of healthcare professionals should be undertaken.

I. Introduction

In 2009, a landmark workforce study conducted by Mueller and colleagues titled "A Critical Match: Nebraska's Health Workforce Planning Project" documented a concerning maldistribution of the healthcare workforce in the State of Nebraska.[1] In particular, although one in four Nebraskans live in rural areas, these communities face critical barriers in accessing care including primary care.[2,3] Since the 2009 study, more recent research commissioned by the Nebraska AHEC Program and conducted by the Center for Health Policy (CHP) documented major gaps in rural access to the physician workforce including primary care.[4] In 2017, 13 out of 93 counties in Nebraska did not have any primary care physician, for example.[5] While most of those counties have less than 1,000 in population, significant challenges to healthcare still exist.[6] Other concerns highlighted in the report included an aging physician workforce with one in five physicians aged older than 65 years. Thus, at the same time that age-related healthcare needs of Nebraskans are increasing, there may be fewer practicing physicians to meet these needs. Finally, prior research documented a wide divide between the race/ethnic demographic composition of the healthcare workforce and the projected demographic composition of the Nebraskan population.[7,8] One in five Nebraskans are racial or ethnic minorities, and the Hispanic population is projected to triple over the coming decades.[9,10] Therefore, ensuring the development of a diverse healthcare workforce that better represents the state's changing demographics and a workforce with a focus on providing culturally competent healthcare is critical for improving health and health outcomes.

One of the recommendations of the previously published report included undertaking annual reporting of the healthcare workforce in Nebraska. The current report helps meet this recommendation, providing policymakers, educational programs and other stakeholders with updated information on the current state of the healthcare workforce for every county in Nebraska.

1 Mueller K, Nayar P, Shaw-Sutherland K, Nguyen A, Xu L, Vanosdel N, Hummel D. "A Critical Match". Nebraska's Health Workforce Planning Project. Final Report. September 2009. Nebraska Center for Rural Health Research. College of Public Health, University of Nebraska Medical Center. Omaha, NE.

2 Federal Office of Rural Health Policy. Health Resources & Services Administration. List of Rural Counties And Designated Eligible Census Tracts in Metropolitan Counties. Available at: https://www.hrsa.gov/ruralhealth/resources/forhpeligibleareas.pdf. Accessed January 15, 2018.

3 U.S. Census Bureau. Nebraska: 2010. Population and housing unit counts. Available at: https://www.census.gov/prod/cen2010/cph-2-29.pdf. Accessed January 15, 2018.

4 Wilson FA, Wehbi NK, Larson J, et al. The Status of the Healthcare Workforce in the State of Nebraska. Omaha, NE: UNMC Center for Health Policy; 2018.

5 Ibid.

6 U.S. Census Bureau. Annual Estimates of the Resident Population: April 1, 2010 to July 1, 2018. U.S. Census Bureau, Population Division. Web. May 2019. http://www.census.gov/.

7 U.S. Census Bureau. Quick Facts. Nebraska population estimates.

8 Tobias M. Nebraska's Hispanic/Latino Population Could Triple by 2050. NET News. August 20, 2013. Available at: http://netnebraska.org/article/news/nebraskas-hispaniclatino-population-could-triple-2050. Accessed January 15, 2018.

9 U.S. Census Bureau. Quick Facts. Nebraska population estimates.

10 Tobias M. Nebraska's Hispanic/Latino Population Could Triple by 2050. NET News. August 20, 2013. Available at: http://netnebraska.org/article/news/nebraskas-hispaniclatino-population-could-triple-2050. Accessed January 15, 2018.

II. Data Source and Methods

Data on licensed healthcare professionals in the State of Nebraska are provided by the Health Professions Tracking Service (HPTS) at the University of Nebraska Medical Center.[11] HPTS extends licensing data available from the State of Nebraska Department of Health and Human Services (DHHS) by identifying licensed professionals who are actively practicing and compiling data on professional work hours for several professions and each practice site. Regular and consistent data collection efforts ensure that HPTS data are up-to-date and accurate. In our study, we utilized HPTS data from June 2019 to examine actively practicing physicians, advanced practice registered nurses, physician assistants, dentists, pharmacists, physical therapists, and occupational therapists. Advanced practice registered nurses (APRN) were stratified by nurse practitioners, certified nurse midwives, clinical nurse specialists, and certified registered nurse anesthetists. All providers are licensed in the State of Nebraska. Providers with available work hour data were determined to be actively practicing if their professional work hours were reported to be non-zero. Work hours and practice sites were available for physicians, APRNs, physician assistants, dentists, and pharmacists.

In addition to the above HPTS data, State of Nebraska licensure data were obtained for the following professions:

- Registered nurses
- Licensed practical nurses
- Dental hygienists
- Pharmacy technicians
- Emergency medical technicians
- Medical nutrition therapists
- Respiratory care practitioners
- Speech-language pathologists
- Audiologists
- Medical radiographers
- Chiropractors
- Podiatrists
- Optometrists

Unlike the HPTS data on actively practicing providers, not all of these licensed providers may be actively practicing. Location data for licensed providers were based on addresses supplied by the State of Nebraska medical licensure database. Note that visiting specialties or part-time providers with rotating schedules may provide services in more than one community.

The analyses consist of examining the number and demographic characteristics of providers in addition to the mapping of their geographical distribution across counties in Nebraska. Geographical mapping utilized location data for providers who reported a Nebraska-based address; licensed providers with an out-of-state address were excluded from the mapping analysis. Demographic characteristics include age, sex and race/ethnicity. Race/ethnic categories are White, Black/African-American, Hispanic/Latino, Asian, American Indian/Alaska Native, Native Hawaiian/Other Pacific Islander, and Other. US Census Bureau 2018 population estimates for the State of Nebraska were used to adjust workforce data for county and state population size.[12] The 2018 Census data were the most recent available for the state. STATA 16.0 (StataCorp, College Station, TX) was used for statistical analyses, and the ArcGIS Pro geographic information system (Esri, Redlands, CA) was used for geographical analyses.

11 Health Professions Tracking Service (HPTS). Key products and services. Available at: https://www.unmc.edu/publichealth/hpts/index.html. Accessed January 15, 2018.

12 U.S. Census Bureau. Quick Facts. Nebraska population estimates. July 1, 2018. Available at: https://www.census.gov/quickfacts/NE. Accessed January 15, 2019.

III. Distribution and Characteristics of Professionals

PHYSICIANS

There are 104 medical specialties and an additional 39 surgical specialties in the HPTS database. Based on these specialties, we specifically examined the primary care fields of family medicine, general practice, internal medicine, obstetrics and gynecology, and pediatrics. In addition, we present results for general surgeons in Nebraska.

Compared to 2017, the number of physicians practicing in Nebraska increased in 2019. There is a total of 4,971 practicing physicians in Nebraska, which is an increase of 144 since 2017. This continues an upward trend in the overall physician workforce since 2007, resulting in a 22.6% increase during the period 2007 to 2019.[8] However, this growth was driven by increases in pediatric, general surgery and other physician specialties. Among primary care physicians, there are fewer family medicine/general practice (24), internal medicine (8) and obstetrics/gynecology (4) physicians in 2019 compared to 2017. Overall, there are 20 fewer active practice primary care physicians in 2019 than 2017.

Table 1. Number and rate per 100,000 population by specialty of physician in 2017 and 2019*

	2017		2019	
	N	RATE PER 100,000	N	RATE PER 100,000
Primary care	1,794	94.1	1,774	92.0
Family medicine/general practice	894	46.9	870	45.1
Internal medicine	395	20.7	387	20.1
Obstetrics & gynecology	214	11.2	210	10.9
Pediatrics	291	15.3	307	15.9
Other specialties				
General surgery	172	9.0	188	9.7
Other	2,861	150.0	3,009	156.0
Total	4,827	253.1	4,971	257.7

*Physicians include medical doctors (MD), doctors of osteopathy (DO), physicians with bachelor of medicine, bachelor of surgery (MBBS), residents and fellows.

In 2007, nearly 40% of physicians were 51 years of age or older.[8] We found that the age distribution of physicians in 2019 is similar but slightly older to that in 2007, with 39.2% of physicians aged 51 years or older (Table 2). Eighteen percent of physicians in Nebraska are currently more than 60 years old, and thus likely to retire in the near future. There is an increasing proportion of female physicians in 2019 compared to either 2017 or 2007, accounting for 32.7% of physicians in 2019 versus 31.4% in 2017 and 26.0% in 2007 (Table 2).[8] The race/ethnic distribution of physicians in Nebraska is predominantly white, non-Hispanic (87.4%), followed by Asian (7.5%), Hispanic/Latino (2.6%) and Black/African-American (1.7%).

Table 2. Sex, race/ethnicity and age distribution of physicians

	2017		2019	
	N	%	N	%
Sex*				
Female	1,509	31.4	1,625	32.7
Male	3,305	68.6	3,340	67.3
Race/ethnicity**				
White	3,085	87.3	3,085	87.4
Black/African American	58	1.6	59	1.7
Hispanic/Latino	91	2.6	93	2.6
Asian	276	7.8	264	7.5
American Indian/Alaska Native	5	0.1	4	0.1
Native Hawaiian/Other Pacific Islander	3	0.1	4	0.1
Other	18	0.5	22	0.6
Age in years***				
≤30	463	9.6	430	8.7
31-35	623	12.9	738	14.9
36-40	654	13.6	682	13.7
41-45	602	12.5	635	12.8
46-50	518	10.7	534	10.8
51-55	555	11.5	490	9.9
56-60	526	10.9	532	10.7
61-65	483	10.0	468	9.4
66-70	258	5.4	275	5.5
>70	139	2.9	181	3.7

*Sex was not reported for 13 physicians.
**Race/ethnicity was not reported for 1,291 physicians.
***Age was not reported for six physicians.

Location (primary and satellite) data for providers were utilized to determine the number of providers per 100,000 population for each county in Nebraska. The distributions for primary care and other physician types are presented in Figures 1 to 6. Although sparsely populated, 14 out of 93 counties do not have any active primary care physicians (family medicine, general practice, internal medicine, OB/GYN, pediatrics) (Figure 1). This is an increase of one county (Gosper) compared to the year 2017 when 13 counties did not have active primary care physicians.

All counties except Douglas and Lancaster have been designated by the State of Nebraska as shortage areas for at least one type of primary care specialty (refer to Appendices B, C, and D). For example, 58 out of 93 counties are designated shortage areas for family physicians. Aside of Scotts Bluff and Dawes counties, most of western Nebraska either has no primary care physicians or has relatively low numbers of physicians relative to population size. Low numbers of primary care physicians also exist in northeast Nebraska and various counties in southern Nebraska.

Distributions are similar for family medicine/general practice physicians (Figure 2), although family medicine and general practice physicians are the predominate specialty throughout the state in comparison to internal medicine, OB/GYN and pediatrics (Figures 3-5). Compared to 2017, Valley and Harlan counties no longer have an active practice internal medicine physician.

For OB/GYN physicians, there has been an alarming decrease in the number of counties with actively practicing physicians since 2017. Only 39 counties have active OB/GYN physicians in 2019 compared to 49 out of 93 counties in 2017. Among pediatric physicians (Figure 5), Thurston County no longer has any pediatric physicians in 2019 compared to 2017; there were no other changes to the distribution of pediatric physicians. Although Brown and Washington counties gained active practice general surgeons in 2017-2019, Furnas, Knox, and Colfax counties now do not have any general surgeons practicing there (Figure 6).

Figure 1. Number of active primary care physicians per 100,000 population by county, Nebraska

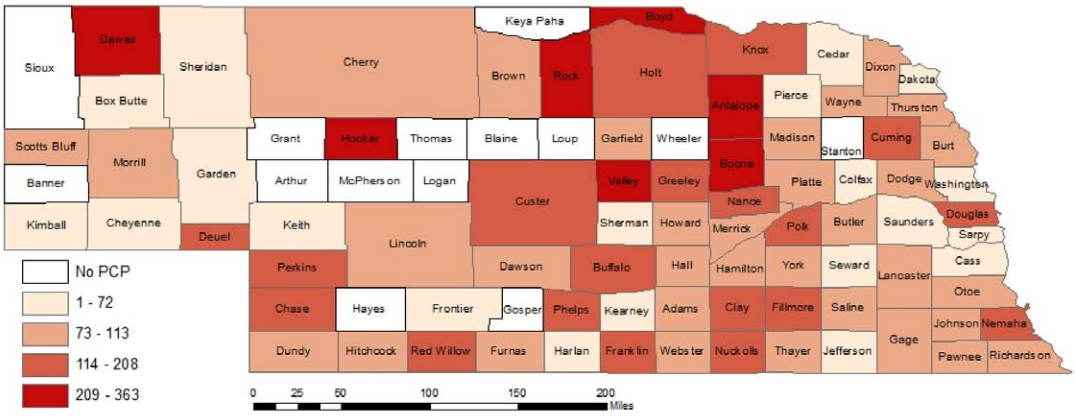


Figure 2. Number of active family medicine physicians per 100,000 population by county, Nebraska

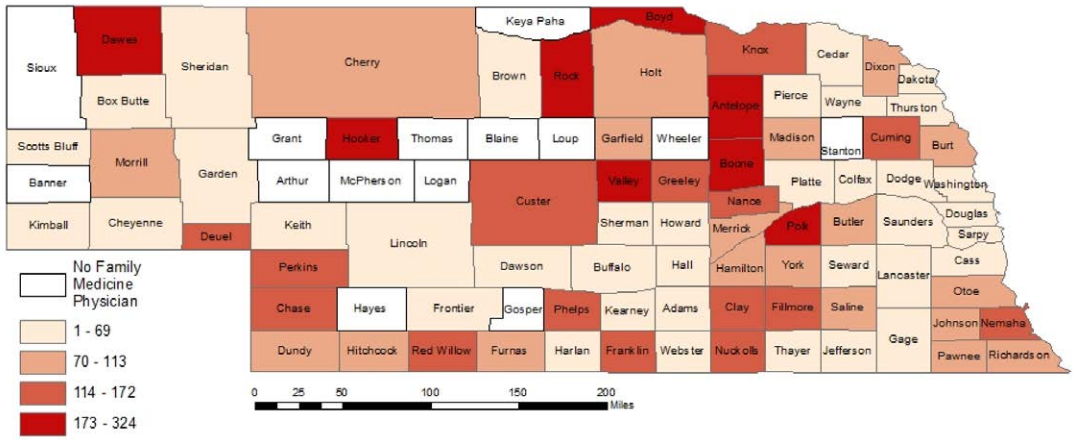


Figure 3. Number of active internal medicine physicians per 100,000 population by county, Nebraska

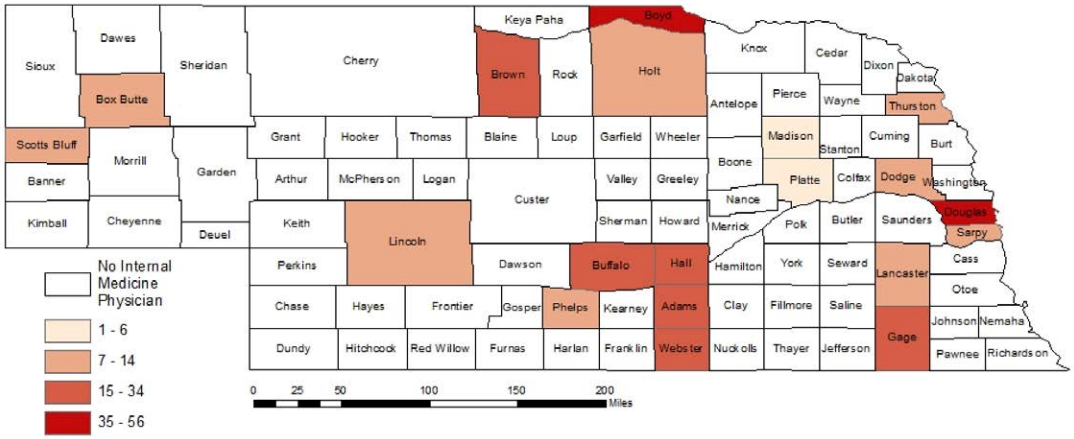
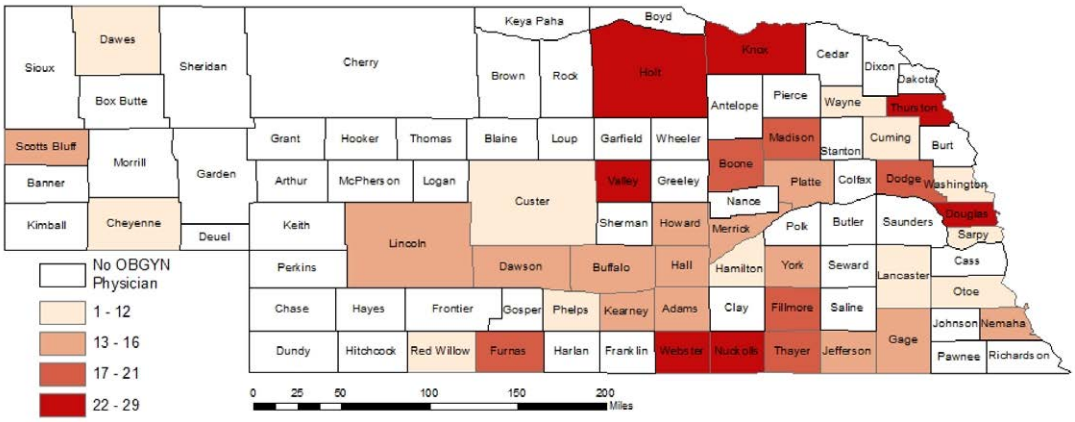


Figure 4. Number of active OB/GYN physicians per 100,000 population by county, Nebraska



*OB/GYN, Obstetrics and Gynecology

Figure 5. Number of active pediatric primary care physicians per 100,000 population by county, Nebraska

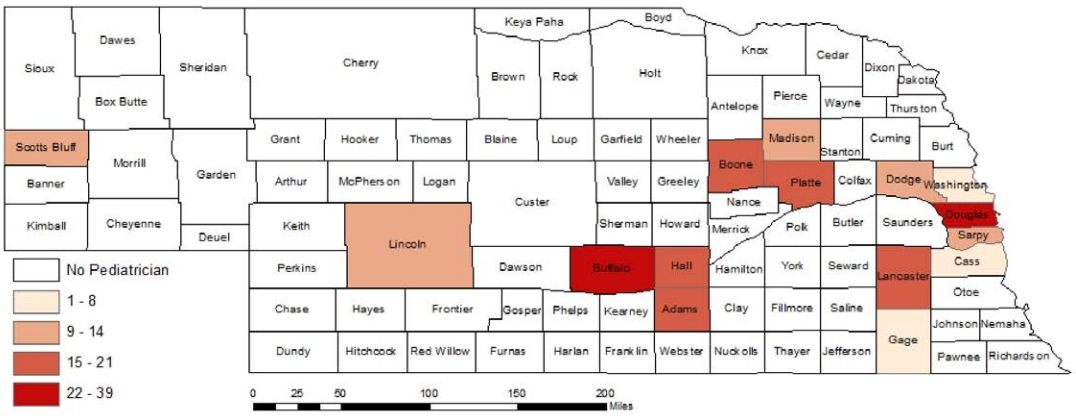
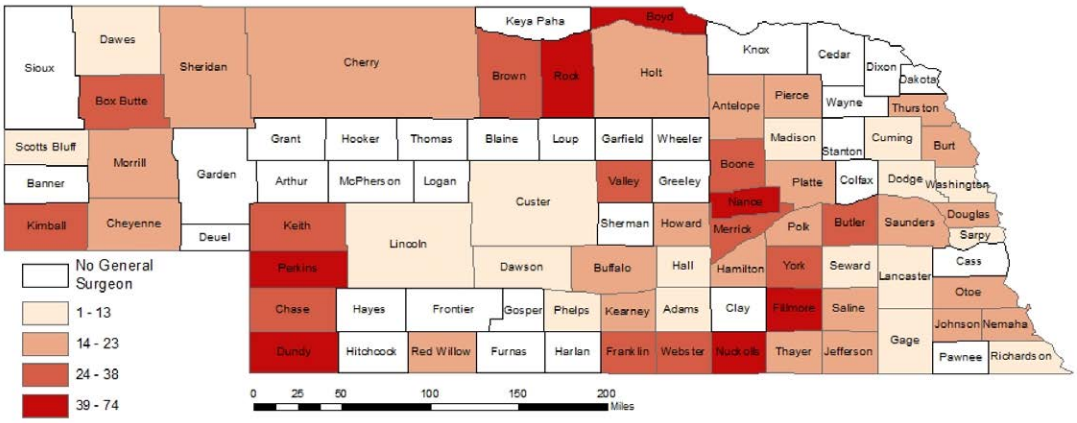


Figure 6. Number of active general surgeons per 100,000 population by county, Nebraska



PHYSICIAN ASSISTANTS

Since 2007, there has been a large increase in the number of active physician assistants (PA) in the state, increasing from 598 to 1,013 PAs in the 2007-2019 period.[13] Half of the PAs are 40 years old or younger, and 73.5% of PAs are female (Table 3). In 2017, 71.5% of PAs were female, in comparison. For race/ethnicity, 96.7% of PAs are white non-Hispanic. Analysis of the distribution of PAs by county showed that 16 counties in Nebraska, although sparsely populated, do not have an active PA (Figure 7). The geographical distribution of physician assistants is slightly changed from 2017, with Frontier county gaining a physician assistant and Franklin County losing a physician assistant (Figure 7).

Table 3. Sex, race/ethnicity and age distribution of physician assistants

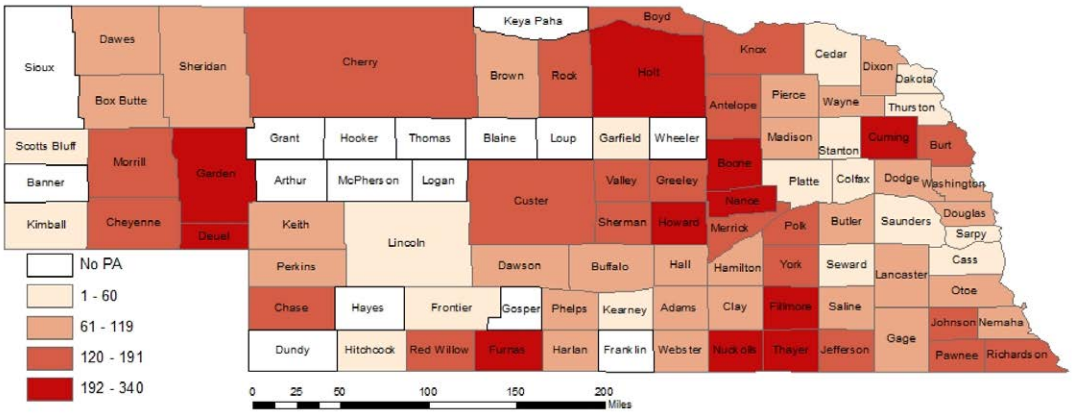
	2017		2019	
	N	%	N	%
Sex				
Female	649	71.5	745	73.5
Male	259	28.5	268	26.5
Race/ethnicity*				
White	741	96.8	785	96.4
Black/African American	3	0.4	4	0.5
Hispanic/Latino	11	1.4	12	1.5
Asian	8	1.0	9	1.1
American Indian/Alaska Native	2	0.3	3	0.4
Native Hawaiian/Other Pacific Islander	1	0.1	1	0.1
Other	0	0.0	0	0.0

13 Mueller K, Nayar P, et al. "A Critical Match".

	2017		2019	
	N	%	N	%
Age in years**				
≤30	162	17.9	197	19.5
31-35	178	19.6	191	18.9
36-40	140	15.4	155	15.3
41-45	127	14.0	137	13.5
46-50	106	11.7	123	12.2
51-55	65	7.2	77	7.6
56-60	53	5.8	56	5.5
61-65	59	6.5	47	4.6
>65	17	1.9	29	2.9

*Race/ethnicity was not reported for 142 physician assistants in 2017 and 199 physician assistants in 2019.
**Age was not reported for one physician assistant in 2017 and 2019.

Figure 7. Number of active physician assistants per 100,000 population by county, Nebraska



NURSE PROFESSIONALS

Advanced Practice Registered Nurses

Advanced practice registered nurses (APRN) include nurse practitioners (NP), certified nurse midwives (CNM), clinical nurse specialists (CNS), and certified registered nurse anesthetists (CRNA). In 2019, there were 1,335 nurse practitioners (NP), 37 certified nurse midwives (CNM), 47 clinical nurse specialists (CNS), and 368 certified registered nurse anesthetists (CRNA) in the State of Nebraska (Table 4). Aside from CNS which exhibited a small decrease, APRNs number increased substantially from 2017 to 2019. There are now 187 new nurse practitioners since 2017.

Table 4. Number, rate per 100,000 population, total work hours and full-time equivalence (FTE) by type of advanced practice registered nurse (APRN)

	2017		2019	
	N	RATE PER 100,000	N	RATE PER 100,000
Nurse Practitioner (NP)	1,148	60.2	1,335	69.2
Certified Nurse Midwife (CNM)	36	1.9	37	1.9
Clinical Nurse Specialist (CNS)	49	2.6	47	2.4
Certified Registered Nurse Anesthetist (CRNA)	308	16.2	368	19.1
Total	1,541	80.8	1,786	92.6

*Total professional work hours were capped at 40 hours per week. Work hours may include on-call hours.

Tables 5 to 8 present the age distribution of APRN professionals by type. There are substantial differences in age across APRNs. Only 10.7% of nurse practitioners are above the age of 60 (Table 5); this compares to almost half of clinical nurse specialists who are older than 60 years (Table 7). The percentage of females across APRNs ranges from 52.6% for CRNAs to 100% of CNMs. Compared to 2017, the demographic distribution in 2019 is substantively similar.

Table 5. Sex, race/ethnicity and age distribution of active nurse practitioners (NP)

	2017		2019	
	N	%	N	%
Sex				
Female	1,097	95.6	1,258	94.2
Male	51	4.4	77	5.8
Race/ethnicity*				
White	788	96.5	898	96.8
Black/African American	9	1.1	9	1.0
Hispanic/Latino	10	1.2	11	1.2
Asian	8	1.0	8	0.9
American Indian/Alaska Native	2	0.2	2	0.2
Native Hawaiian/Other Pacific Islander	0	0.0	0	0.0
Other	0	0.0	0	0.0
Age in years**				
≤30	76	6.6	75	5.6
31-35	235	20.5	280	21.0
36-40	197	17.2	265	19.9
41-45	181	15.8	189	14.2
46-50	119	10.4	176	13.2
51-55	107	9.3	110	8.3
56-60	108	9.4	95	7.1
61-65	86	7.5	100	7.5
>65	37	3.2	42	3.2

*Race/ethnicity was not reported for 331 NPs in 2017 and 407 NPs in 2019.
**Age was not reported for two NPs in 2017 and three NPs in 2019.

Table 6. Sex, race/ethnicity and age distribution of active certified nurse midwives (CNM)

	2017		2019	
	N	%	N	%
Sex				
Female	36	100.0	37	100.0
Male	0	0.0	0	0.0
Race/ethnicity*				
White	20	87.0	19	86.4
Black/African American	2	8.7	2	9.1
Hispanic/Latino	1	4.3	1	4.5
Asian	0	0.0	0	0.0
American Indian/Alaska Native	0	0.0	0	0.0
Native Hawaiian/Other Pacific Islander	0	0.0	0	0.0
Other	0	0.0	0	0.0
Age in years				
≤30	1	2.8	2	5.4
31-35	8	22.2	5	13.5
36-40	9	25.0	9	24.3
41-45	5	13.9	8	21.6
46-50	5	13.9	3	8.1
51-55	2	5.6	1	2.7
56-60	2	5.6	4	10.8
61-65	3	8.3	3	8.1
>65	1	2.8	2	5.4

*Race/ethnicity was not reported for 11 CNMs in 2017 and 15 CNMs in 2019.

Table 7. Sex, race/ethnicity and age distribution of active clinical nurse specialists (CNS)

	2017		2019	
	N	%	N	%
Sex				
Female	48	98.0	46	97.9
Male	1	2.0	1	2.1
Race/ethnicity*				
White	45	97.8	43	97.7
Black/African American	0	0.0	0	0.0
Hispanic/Latino	0	0.0	0	0.0
Asian	0	0.0	0	0.0
American Indian/Alaska Native	1	2.2	1	2.3
Native Hawaiian/Other Pacific Islander	0	0.0	0	0.0
Other	0	0.0	0	0.0
Age in years				
31-35	2	4.1	2	4.3
36-40	4	8.2	2	4.3
41-45	5	10.2	3	6.4
46-50	4	8.2	4	8.5
51-55	7	14.3	8	17.0
56-60	11	22.4	7	14.9
61-65	11	22.4	14	29.8
>65	5	10.2	7	14.9

*Race/ethnicity was not reported for 3 CNSs in 2017 and 3 CNSs in 2019.

Table 8. Sex, race/ethnicity and age distribution of active certified registered nurse anesthetists (CRNA)

	2017		2019	
	N	%	N	%
Sex				
Female	158	51.3	193	52.6
Male	150	48.7	174	47.4
Race/ethnicity*				
White	192	98.0	227	96.2
Black/African American	0	0.0	1	0.4
Hispanic/Latino	2	1.0	5	2.1
Asian	2	1.0	3	1.3
American Indian/Alaska Native	0	0.0	0	0.0
Native Hawaiian/Other Pacific Islander	0	0.0	0	0.0
Other	0	0.0	0	0.0
Age in years**				
≤ 30	7	2.3	10	2.7
31-35	45	14.6	67	18.2
36-40	59	19.2	74	20.1
41-45	40	13.0	48	13.0
46-50	35	11.4	52	14.1
51-55	27	8.8	24	6.5
56-60	38	12.3	32	8.7
61-65	36	11.7	37	10.1
>65	21	6.8	24	6.5

* Race/ethnicity was not reported for 112 CRNAs in 2017 and 132 CRNAs in 2019.
** Age was not reported for one NP in 2019.

Figure 8 identifies 17 out of 93 counties with no active APRNs in 2019 compared to 18 counties without an APRN in 2017. In Figure 9, 18 counties do not have a nurse practitioner, which is one less than in 2017 (Dixon gained a nurse practitioner since 2017). It is important to note that the majority of these counties have a population of less than 1,000.The geographical distribution of CNM, CNS, and CRNA professionals are provided in Figures 10-12. The majority of counties in Nebraska do not have either CNM or CNS specialties.

Figure 8. Number of active advanced practice registered nurses (APRN) per 100,000 population by county, Nebraska

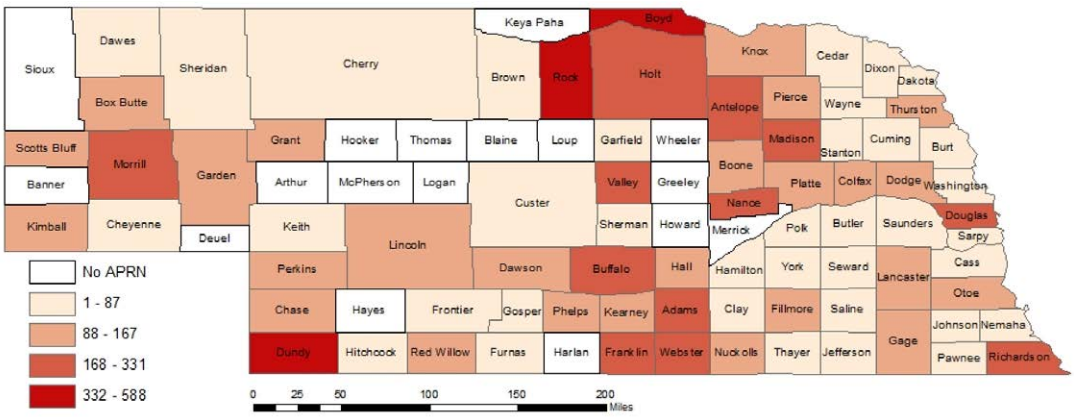


Figure 9. Number of active nurse practitioners (NP) per 100,000 population by county, Nebraska

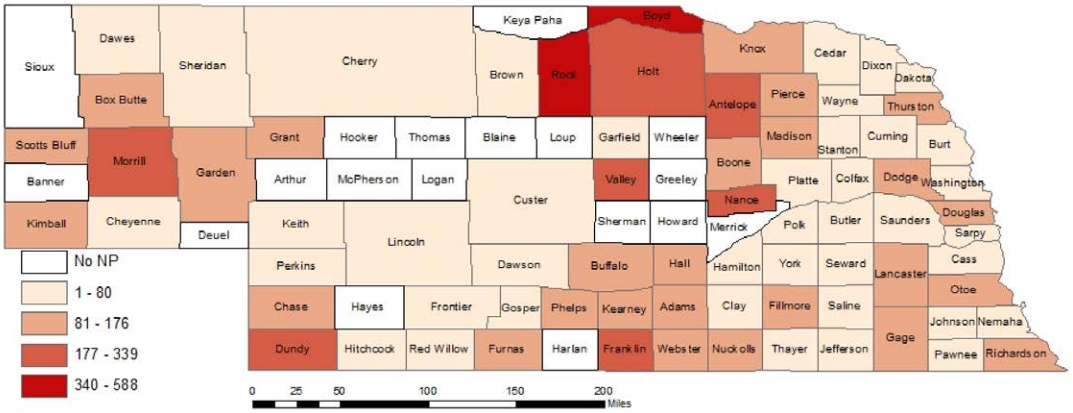


Figure 10. Number of active certified nurse midwives (CNM) per 100,000 population by county, Nebraska

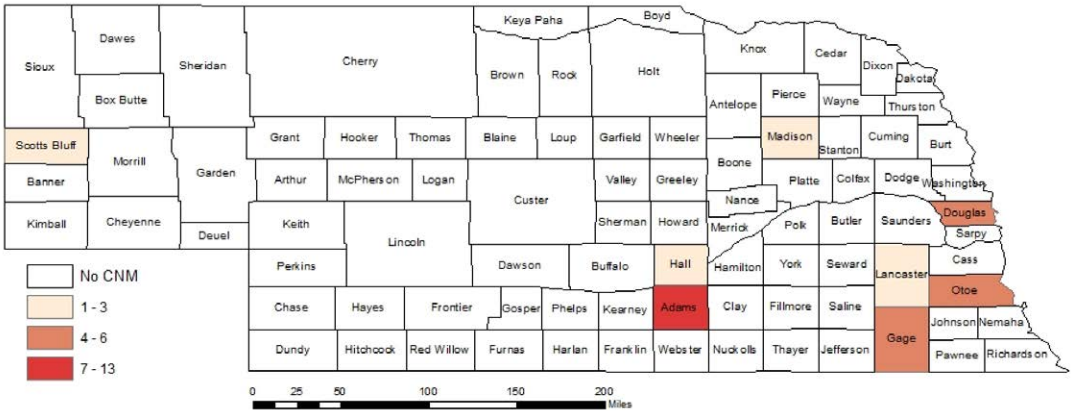


Figure 11. Number of active clinical nurse specialists (CNS) per 100,000 population by county, Nebraska

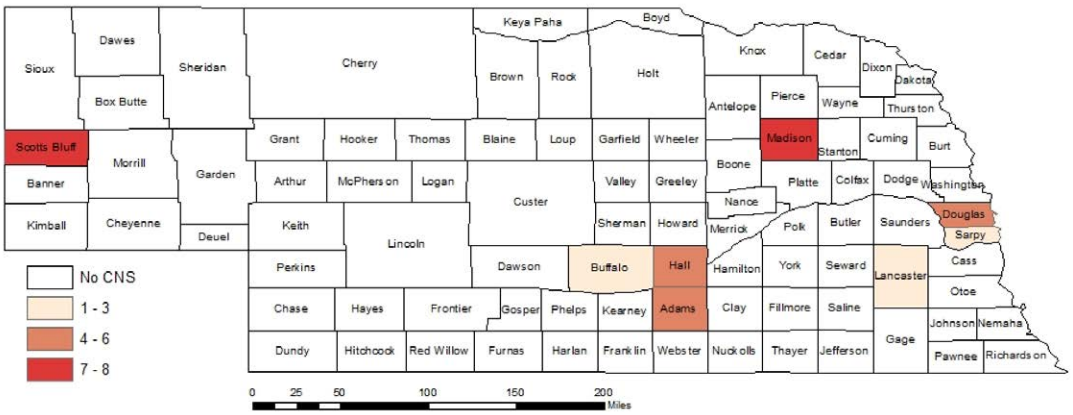
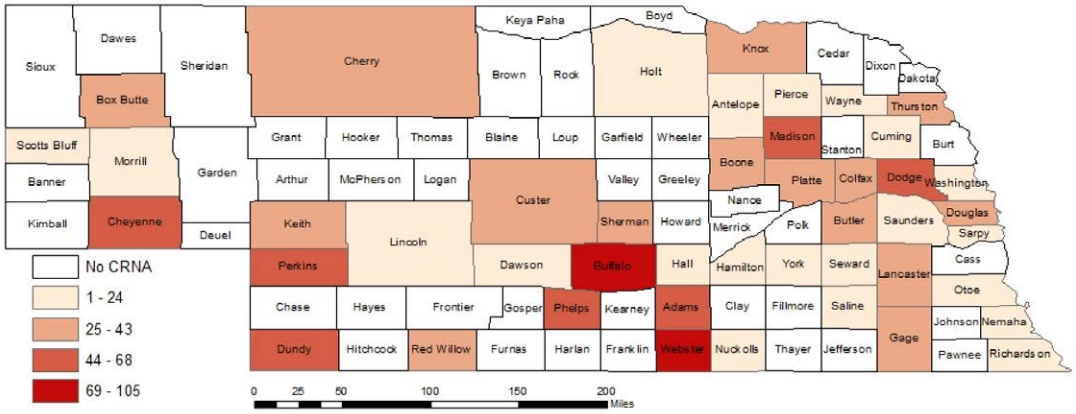


Figure 12. Number of active certified registered nurse anesthetists (CRNA) per 100,000 population by county, Nebraska



Registered Nurses and Licensed Practical Nurses

Data on the supply of registered nurses (RN) and licensed practical nurses (LPN) for Nebraska are provided below. In 2019, there were 29,059 RNs and 5,892 LPNs licensed in the state (Table 9). These are significant increases from 2017 when there were 27,922 RNs and 5,600 LPNs. In terms of per-capita rates, there are now 1,811.6 RNs and LPNs per 100,000 population compared to 1,757.7 in the year 2017.

Table 9. Number and rate per 100,000 population by type of nurse professional*

	2017		2019	
	N	RATE PER 100,000	N	RATE PER 100,000
Registered Nurse (RN)	27,922	1,464.1	29,059	1,506.2
Licensed Practical Nurse (LPN)	5,600	293.6	5,892	305.4
Total	33,522	1,757.7	34,951	1,811.6

*Hours and FTE are not available for RN or LPN.

Tables 10 and 11 present the demographic distribution of RNs and LPNs. Males account for 6.8% of RNs and 3.3% of LPNs. The age distribution of RNs skews substantially younger (Table 10) compared to LPNs (Table 11). However, the age distribution of both RNs and LPNs is older in 2019 compared to 2017. For example, in 2017, 13.4% of LPNs were aged 30 or less; in 2019, this percentage is 9.8%.

Table 10. Sex and age distribution of registered nurses (RN)

	2017		2019	
	N	%	N	%
Sex				
Female	26,089	93.6	27,068	93.2
Male	1,786	6.4	1,962	6.8
Age in years**				
≤30	5,215	18.7	4,638	16.0
31-35	4,018	14.4	4,235	14.6
36-40	3,285	11.8	4,040	13.9
41-45	2,842	10.2	3,072	10.6
46-50	2,481	8.9	2,747	9.5
51-55	2,960	10.6	2,467	8.5
56-60	3,066	11.0	3,037	10.5
61-65	2,710	9.7	2,786	9.6
>65	1,301	4.7	2,002	6.9

*Sex was not reported for 47 RNs and 29 RNs in 2019.
**Age was not reported for 44 RNs in 2017 and 35 RNs in 2019.

Table 11. Sex and age distribution of licensed practical nurses (LPN)

	2017		2019	
	N	%	N	%
Sex				
Female	5,410	96.6	5,698	96.7
Male	190	3.4	194	3.3
Age in years**				
≤30	750	13.4	575	9.8
31-35	707	12.6	577	9.8
36-40	705	12.6	779	13.2
41-45	571	10.2	650	11.0
46-50	566	10.1	644	10.9
51-55	642	11.5	593	10.1
56-60	703	12.6	755	12.8
61-65	632	11.3	758	12.9
>65	317	5.7	555	9.4

*Age was not reported for seven LPNs in 2017 and 6 LPNs in 2019.

The geographical distributions of the number of nurse professionals per 100,000 population are available below. All counties in Nebraska have RNs, and only three counties (Arthur, McPherson, Keya Paha) do not have an LPN (Figures 13 and 14). Wheeler County gained an LPN since 2017 when no LPNs were located in that county. The distribution of RNs and LPNs varies substantially across the state. For example, the highest concentrations of RNs are in Scotts Bluff County and eastern Nebraska.

Figure 13. Number of registered nurses (RN) per 100,000 population by county, Nebraska

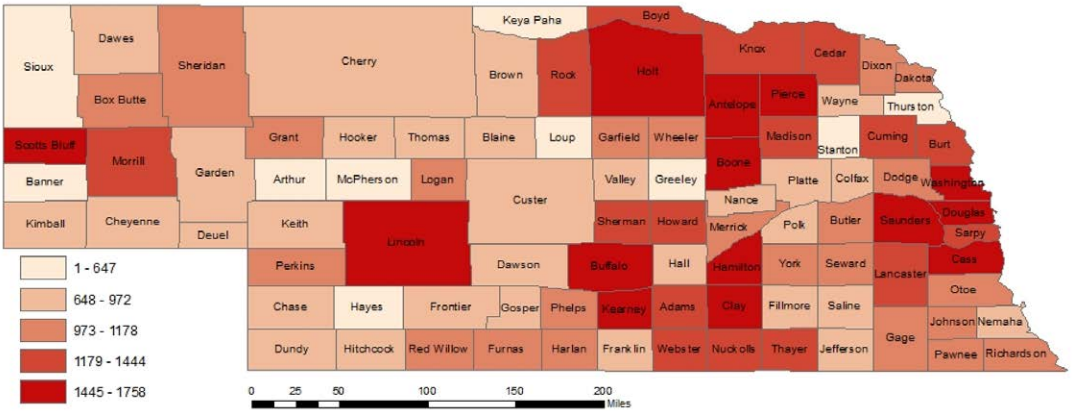
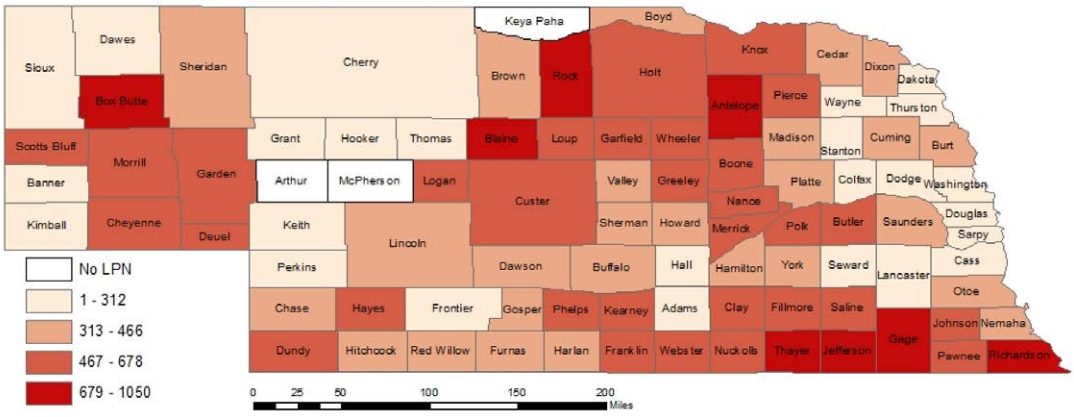


Figure 14. Number of licensed practical nurses (LPN) per 100,000 population by county, Nebraska



DENTAL HEALTH PROFESSIONALS

There are 1,085 licensed dentists who are actively practicing in the State of Nebraska in 2019, an increase of 8 dentists since 2017 (Table 12). Of those, there are 864 general dentists in the state, but only 221 dental specialists. Dental hygienists increased in number from 1,366 in 2017 to 1,423 in 2019—an increase of 4.2% (Table 12). The most common dental specialties are orthodontics, pediatrics, and endodontics.

Table 12. Number and rate per 100,000 population by type of dental professional

TYPE	2017		2019	
	N	RATE PER 100,000	N	RATE PER 100,000
Dentist	1,077	56.5	1,085	56.2
General dentist	854	44.8	864	44.8
Other dentist	223	11.7	221	11.5
Dental hygienist	1,366	71.6	1,423	73.8
Total	2,443	128.4	2,508	130.0

Dental hygienists are almost exclusively female (98.3%) while 27.6% of dentists are female (Tables 13 and 14). However, the percentage of dentists who are female has increased from 24.8% in 2017, and from only 16.9% in 2007 as reported by Mueller and colleagues. Dentists are likely to be white non-Hispanic (94.1%), with only 2.5% Asian, 2.0% Hispanic and 0.6% Black/African-American (Table 13). Race/ethnicity data are not available for dental hygienists. The percentage of dentists aged over 60 years old is 23.8%; and is 8.5% for dental hygienists.

Table 13. Sex, race/ethnicity and age distribution of active dentists

	2017		2019	
	N	%	N	%
Sex				
Female	267	24.8	299	27.6
Male	810	75.2	786	72.4
Race/ethnicity*				
White	908	94.4	897	94.1
Black/African American	6	0.6	6	0.6
Hispanic/Latino	18	1.9	19	2.0
Asian	23	2.4	24	2.5
American Indian/Alaska Native	2	0.2	2	0.2
Native Hawaiian/Other Pacific Islander	2	0.2	2	0.2
Other	3	0.3	3	0.3
Age in years**				
≤30	81	7.5	78	7.6
31-35	130	12.1	138	13.5
36-40	130	12.1	148	14.5
41-45	120	11.1	116	11.4
46-50	84	7.8	102	10.0
51-55	92	8.5	71	7.0
56-60	135	12.5	125	12.3
61-65	145	13.5	125	12.3
>65	105	9.8	117	11.5

*Race/ethnicity was not reported for 115 dentists in 2017 and 132 dentists in 2019.

Table 14. Sex and age distribution of dental hygienists

	2017		2019	
	N	%	N	%
Sex				
Female	1,349	98.8	1,399	98.3
Male	17	1.2	24	1.7
Age in years**				
≤30	370	27.4	316	22.4
31-35	222	16.4	235	16.7
36-40	177	13.1	216	15.3
41-45	138	10.2	141	10.0
46-50	124	9.2	142	10.1
51-55	138	10.2	120	8.5
56-60	102	7.5	121	8.6
61-65	64	4.7	86	6.1
>65	18	1.3	34	2.4

*Age was not reported for 13 dental hygienists in 2017 and 12 in 2019.

The geographical distributions of general dentists and dental hygienists in Nebraska, in terms of number of dental professionals per 100,000 population, are provided in Figures 15 and 16. Sixteen counties have no practicing general dentists, and 18 counties have no dental hygienists. In 2017, 15 counties did not have any general dentists, and 20 counties did not have any dental hygienists. With a sparse population, these counties might not be able to support an active provider.

Figure 15. Number of active general dentists per 100,000 population by county, Nebraska

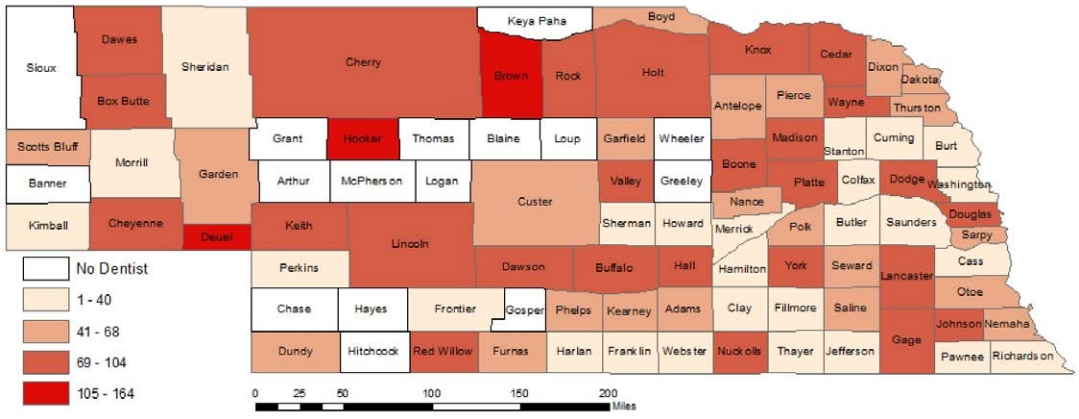
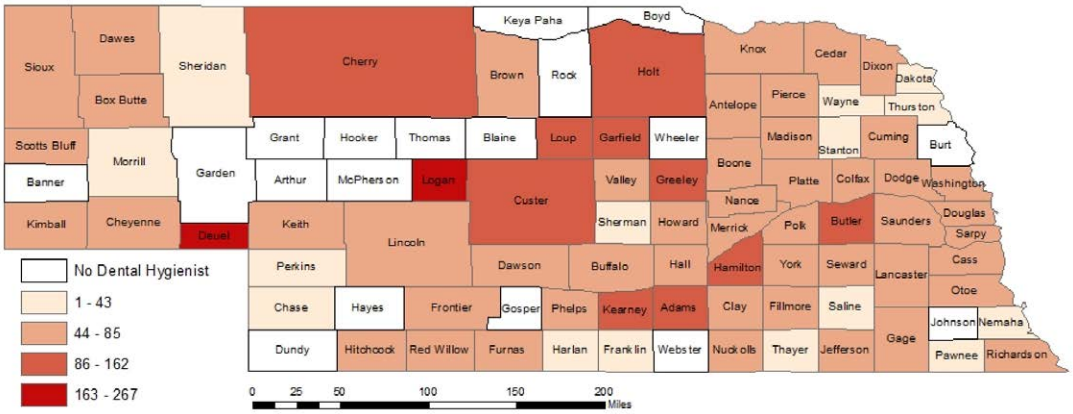


Figure 16. Number of licensed dental hygienists per 100,000 population by county, Nebraska



PHARMACY PROFESSIONALS

Pharmacy professionals consist of licensed pharmacists and pharmacy technicians. Note that pharmacy professionals may work in a variety of healthcare settings outside of retail pharmacy, including hospitals. There are 2,048 pharmacists and 3,511 pharmacy technicians as of 2019 (Table 15). There has been a decrease of 18 pharmacists while the number of pharmacy technicians increased by 83 in the time period 2017-2019.

Table 15. Number and rate per 100,000 population by type of pharmacy professional

	2017		2019	
TYPE	N	RATE PER 100,000	N	RATE PER 100,000
Pharmacist	2,066	108.3	2,048	106.2
Pharmacy technician	3,428	179.7	3,511	182.0
Total	5,494	288.1	5,559	288.1

Tables 16 and 17 report demographic characteristics for pharmacists and pharmacy technicians, respectively. Pharmacists are predominantly middle-aged; 46.6% are between the ages of 31 and 45. Pharmacy professionals are likely to be female, who represent 61% of pharmacists and 81.1% of pharmacy technicians. In both cases, the female percentage is an increase from 2017. White non-Hispanics account for 95% of pharmacists in Nebraska (Table 16).

Table 16. Sex, race/ethnicity and age distribution of active pharmacists

	2017		2019	
	N	%	N	%
Sex				
Female	1,237	59.9	1,248	61.0
Male	828	40.1	799	39.0
Race/ethnicity*				
White	1,639	95.4	1,605	95.0
Black/African American	8	0.5	11	0.7
Hispanic/Latino	22	1.3	22	1.3
Asian	47	2.7	47	2.8
American Indian/Alaska Native	1	0.1	2	0.1
Native Hawaiian/Other Pacific Islander	1	0.1	1	0.1
Other	1	0.1	2	0.1
Age in years**				
≤ 30	231	11.2	204	10.0
31-35	366	17.7	345	16.9
36-40	322	15.6	319	15.6
41-45	258	12.5	288	14.1
46-50	224	10.9	233	11.4
51-55	188	9.1	200	9.8
56-60	174	8.4	159	7.8
61-65	161	7.8	161	7.9
66-70	87	4.2	79	3.9
>70	52	2.5	58	2.8

*Race/ethnicity was not reported for 347 pharmacists in 2017 and 358 pharmacists in 2019.
**Age was not reported for three pharmacists in 2017 and two pharmacists in 2019.

Table 17. Sex and age distribution of licensed pharmacy technicians

	2017		2019	
	N	%	N	%
Sex				
Female	2,725	80.6	2,798	81.1
Male	656	19.4	651	18.9
Age in years**				
≤30	1,607	47.0	1,446	41.4
31-35	420	12.3	461	13.2
36-40	337	9.9	421	12.1
41-45	217	6.4	277	7.9
46-50	241	7.1	217	6.2
51-55	259	7.6	241	6.9
56-60	190	5.6	220	6.3
61-65	109	3.2	145	4.2
>65	38	1.1	66	1.9

*Sex was not reported for 47 pharmacy technicians in 2017 and 21 pharmacy technicians in 2019.
**Age was not reported for 10 pharmacy technicians in 2017 and 17 in 2019.

The rate of pharmacists per 100,000 population for each county in Nebraska is provided in Figure 17. Seventeen out of 93 counties do not have pharmacists in 2019 compared to 18 counties in 2017. There was little substantive change in the distribution of pharmacy technicians between 2017 and 2019 (Figure 18).

Figure 17. Number of active pharmacists per 100,000 population by county, Nebraska

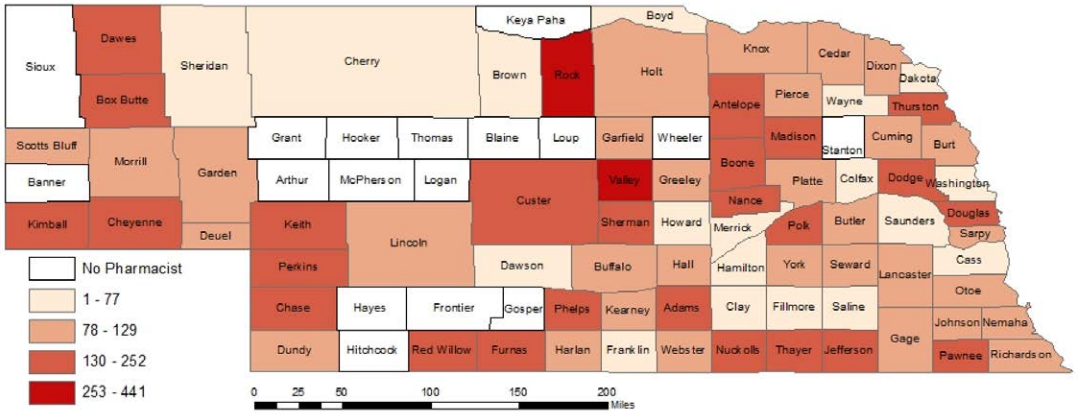
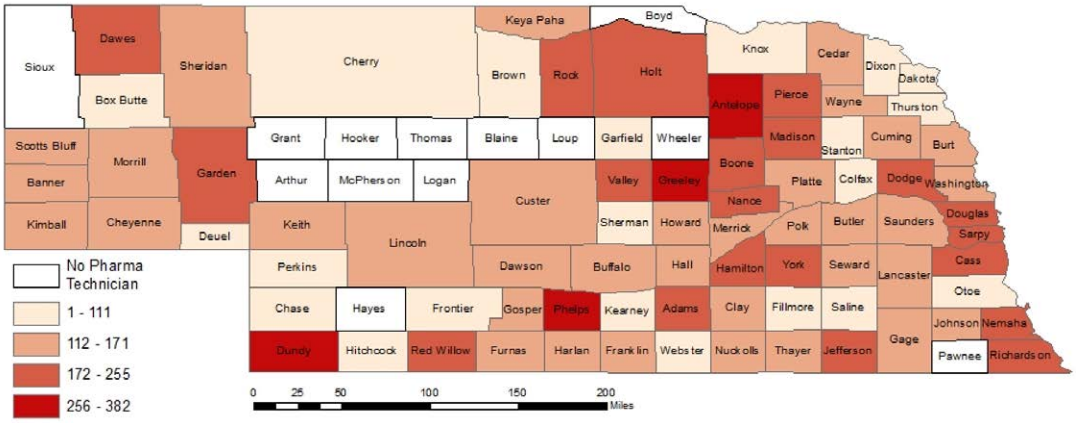


Figure 18. Number of licensed pharmacy technicians per 100,000 population by county, Nebraska



EMERGENCY MEDICAL TECHNICIANS

Emergency Medical Technicians (EMT) include basic, intermediate and advanced EMTs, emergency medical services responders and instructors, and paramedics.

There is a large difference in the number of basic and intermediate EMTs. Our data indicate there are 6,633 EMTs in the State of Nebraska (Table 18). However, this is a decrease of 328 EMTs, or 4.7% since the year 2017. Reasons for this decrease are unclear, but the decreases occurred across all EMT groups (Table 18).

Table 18. Number and rate per 100,000 population by type of emergency medical technician (EMT)

TYPE	2017		2019	
	N	RATE PER 100,000	N	RATE PER 100,000
Advanced EMT	19	1.0	15	0.8
Intermediate EMT	54	2.8	47	2.4
Basic EMT	5,090	266.9	4,988	258.5
Paramedic	1,388	72.8	1,216	63.0
Emergency medical responder	410	21.5	367	19.0
Total	6,961	365.0	6,633	343.8

Among EMTs, 71.5% are males (Table 19). Nearly 18% of EMTs are aged 30 or younger in 2019, which is a decrease from 19.2% in 2017.

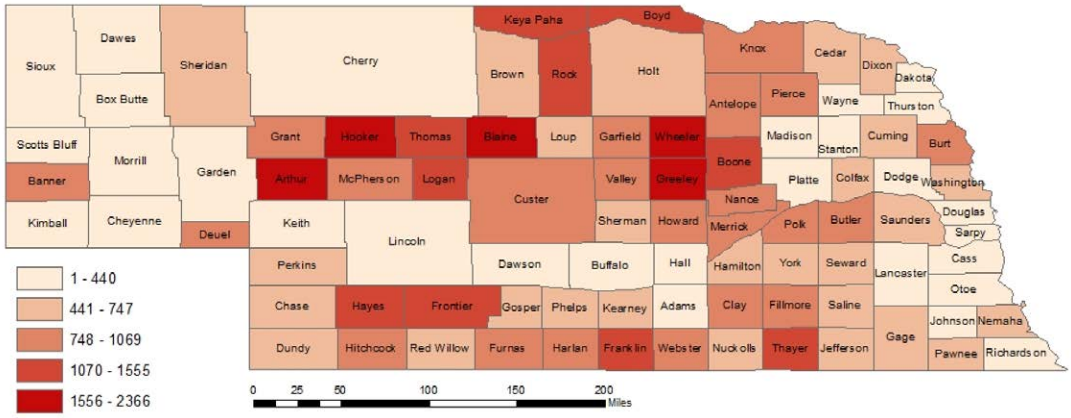
Table 19. Sex and age distribution of licensed emergency medical technicians

	2017		2019	
	N	%	N	%
Sex				
Female	1,523	29.3	1,868	28.5
Male	3,668	70.7	4,677	71.5
Age in years**				
≤30	1,002	19.2	1,170	17.7
31-35	614	11.8	759	11.5
36-40	623	12.0	830	12.6
41-45	634	12.2	826	12.5
46-50	633	12.2	799	12.1
51-55	597	11.5	701	10.6
56-60	493	9.5	669	10.1
61-65	337	6.5	452	6.9
>65	278	5.3	393	6.0

*Sex was not reported for 43 EMTs in 2017 and 10 EMTs in 2019.
**Age was not reported for 23 EMTs in 2017 and 34 EMTs in 2019.

Figure 19 presents the number of EMTs per 100,000 population for each county in Nebraska. All counties have at least one EMT; however, the distribution of EMTs varies substantially across the state with the lowest concentrations of EMTs found in the northeastern, southeastern, south central, and western counties.

Figure 19. Number of licensed emergency medical technicians (EMT) per 100,000 population by county, Nebraska



OTHER ALLIED HEALTH PROFESSIONALS

HPTS provided data on number and age distribution for actively practicing occupational therapists and physical therapists, licensed medical nutrition therapists, respiratory care practitioners, speech language pathologists, audiologists, and medical radiographers. The number and rate per 100,000 population for each profession is provided in Table 20. Rates vary from 8.7 audiologists per 100,000 population up to 111.8 medical radiographers per 100,000. In comparison to 2017 data, there are increased numbers of all allied health professionals with the largest increase occurring for speech language pathologists. The number of speech language pathologists increased from 844 in 2017 to 1,170 in 2019—an increase of 38.6%.

Table 20. Number and rate per 100,000 population by type of allied health professional

	2017		2019	
TYPE	N	RATE PER 100,000	N	RATE PER 100,000
Occupational therapist	787	41.3	805	41.7
Physical therapist	1,367	71.7	1,410	73.1
Medical nutrition therapist	660	34.6	699	36.2
Respiratory care practitioner	1,367	71.7	1,371	71.1
Speech language pathologist	844	44.3	1,170	60.6
Audiologist	161	8.4	167	8.7
Medical radiographer	2,120	111.2	2,156	111.8
Total	7,306	383.1	7,778	403.2

The percentage of females ranges across professions from 65.8% for physical therapists to 96.5% for speech language pathologists (Tables 21-27). Race/ethnicity was available for occupational and physical therapists. These data indicate that 95.1% of physical therapists and 95.8% of occupational therapists are white non-Hispanic (Tables 21 and 22, respectively). In terms of age, speech language pathologists and medical radiographers are the youngest allied health professionals; 20.8% of speech language pathologists and 22.9% of medical radiographers are below the age of 31 (Tables 25 and 27).

Table 21. Sex, race/ethnicity and age distribution of physical therapists

	2017		2019	
	N	%	N	%
Sex				
Female	901	65.9	926	65.8
Male	466	34.1	482	34.2
Race/ethnicity*				
White	719	95.7	744	95.1
Black/African American	3	0.4	3	0.4
Hispanic/Latino	9	1.2	11	1.4
Asian	17	2.3	21	2.7
American Indian/Alaska Native	0	0.0	0	0.0
Native Hawaiian/Other Pacific Islander	1	0.1	1	0.1
Other	2	0.3	2	0.3
Age in years				
≤30	243	17.8	247	17.5
31-35	237	17.3	270	19.2
36-40	225	16.5	214	15.2
41-45	214	15.7	206	14.6
46-50	178	13.0	200	14.2
51-55	108	7.9	116	8.2
56-60	84	6.1	86	6.1
>60	78	5.7	69	4.9

*Race/ethnicity was not reported for 616 physical therapists in 2017 and 628 in 2019.
**Age was not reported for two physical therapists in 2019.

Table 22. Sex, race/ethnicity and age distribution of occupational therapists

	2017		2019	
	N	%	N	%
Sex				
Female	737	93.7	749	93.0
Male	50	6.4	56	7.0
Race/ethnicity*				
White	385	97.0	383	95.8
Black/African American	4	1.0	4	1.0
Hispanic/Latino	4	1.0	6	1.5
Asian	4	1.0	6	1.5
American Indian/Alaska Native	0	0.0	0	0.0
Native Hawaiian/Other Pacific Islander	0	0.0	1	0.3
Other	0	0.0	0	0.0
Age in years				
≤30	192	24.6	184	23.1
31-35	136	17.4	159	19.9
36-40	123	15.8	104	13.0
41-45	130	16.7	134	16.8
46-50	84	10.8	80	10.0
51-55	64	8.2	77	9.7
56-60	23	3.0	34	4.3
>60	28	3.6	26	3.3

*Race/ethnicity was not reported for 390 occupational therapists in 2017 and 405 in 2019.
**Age was not reported for seven occupational therapists in 2017 and seven in 2019.

Table 23. Sex and age distribution of licensed medical nutrition therapists

	2017		2019	
	N	%	N	%
Sex				
Female	628	96.2	658	95.4
Male	25	3.8	32	4.6
Age in years**				
≤30	137	20.8	138	19.7
31-35	84	12.7	88	12.6
36-40	104	15.8	98	14.0
41-45	52	7.9	90	12.9
46-50	37	5.6	52	7.4
51-55	74	11.2	50	7.2
56-60	60	9.1	65	9.3
61-65	69	10.5	56	8.0
>65	43	6.5	62	8.9

*Sex was not reported for seven medical nutrition therapists in 2017 and nine medical nutrition therapists in 2019.

Table 24. Sex and age distribution of licensed respiratory care practitioners

	2017		2019	
	N	%	N	%
Sex				
Female	928	68.2	494	69.6
Male	432	31.8	414	30.4
Age in years**				
≤ 30	222	16.3	172	12.6
31-35	195	14.3	194	14.2
36-40	192	14.1	192	14.0
41-45	166	12.2	183	13.4
46-50	147	10.8	153	11.2
51-55	166	12.2	146	10.7
56-60	152	11.2	154	11.3
61-65	97	7.1	131	9.6
>65	25	1.8	43	3.1

*Sex was not reported for seven respiratory care practitioners in 2017 and 8 in 2019.
**Age was not reported for five respiratory care practitioners in 2017 and three in 2019.

Table 25. Sex and age distribution of licensed speech language pathologists

	2017		2019	
	N	%	N	%
Sex				
Female	807	96.3	1,114	96.5
Male	31	3.7	41	3.5
Age in years**				
≤30	242	29.0	241	20.8
31-35	139	16.6	212	18.3
36-40	87	10.4	154	13.3
41-45	96	11.5	139	12.0
46-50	73	8.7	121	10.4
51-55	49	5.9	87	7.5
56-60	67	8.0	82	7.1
61-65	55	6.6	70	6.0
>65	28	3.4	53	4.6

*Sex was not reported for six speech language pathologists in 2017 and 15 in 2019.
**Age was not reported for eight speech language pathologists and 11 in 2019.

Table 26. Sex and age distribution of licensed audiologists

	2017		2019	
	N	%	N	%
Sex				
Female	122	75.8	128	77.1
Male	38	23.6	38	22.9
Age in years**				
≤30	20	12.5	19	11.5
31-35	24	15.0	22	13.3
36-40	29	18.1	26	15.8
41-45	23	14.4	31	18.8
46-50	15	9.4	14	8.5
51-55	23	14.4	20	12.1
56-60	10	6.3	15	9.1
61-65	9	5.6	8	4.9
>65	7	4.4	10	6.1

*Sex was not reported for one audiologist in 2019.
**Age was not reported for two audiologists in 2019.

Table 27. Sex and age distribution of licensed medical radiographers

	2017		2019	
	N	%	N	%
Sex				
Female	1,763	83.3	1,784	83.1
Male	353	16.7	362	16.9
Age in years**				
≤ 30	566	28.6	468	22.9
31-35	446	22.5	390	19.1
36-40	270	13.6	389	19.1
41-45	179	9.0	196	9.6
46-50	165	8.3	190	9.3
51-55	137	6.9	159	7.8
56-60	112	5.7	120	5.9
61-65	82	4.1	84	4.1
>65	24	1.2	44	2.2

*Sex was not reported for four medical radiographers in 2017 and 10 in 2019.
**Age was not reported for 139 medical radiographers in 2017 and 116 in 2019

The geographical distribution in the rate of providers to population for other allied health professions are presented below (Figures 20-26). There remain substantial gaps in the distribution of allied health professions across Nebraska. For example, only 18 counties in the state have any licensed audiologists, though this compares to 19 counties in 2017. In addition, the north central region of Nebraska has virtually no occupational therapists, speech language pathologists, or medical nutrition therapists. Of the licensed allied health professions below, licensed medical radiographers are the most consistently distributed across Nebraska, with only seven counties having no medical radiographers. This also is an improvement since 2017 when there were nine counties without a medical radiographer considering a low population in these counties.

Figure 20. Number of occupational therapists per 100,000 population by county, Nebraska

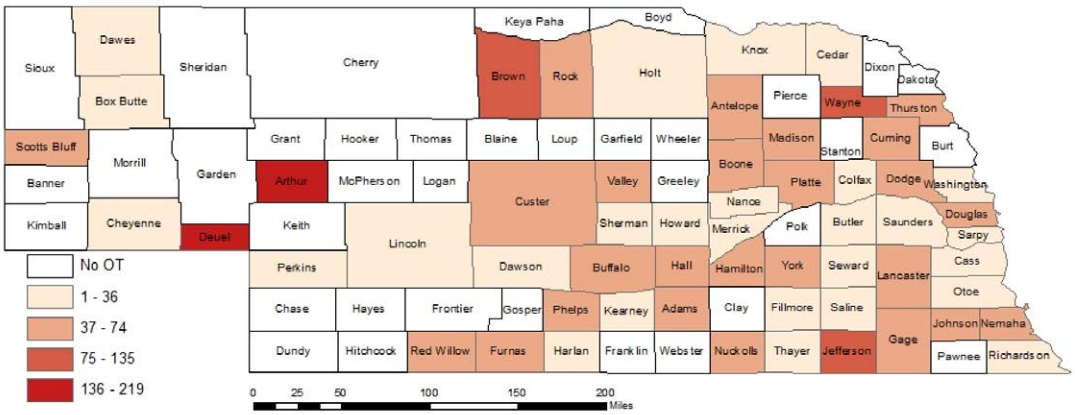


Figure 21. Number of physical therapists per 100,000 population by county, Nebraska

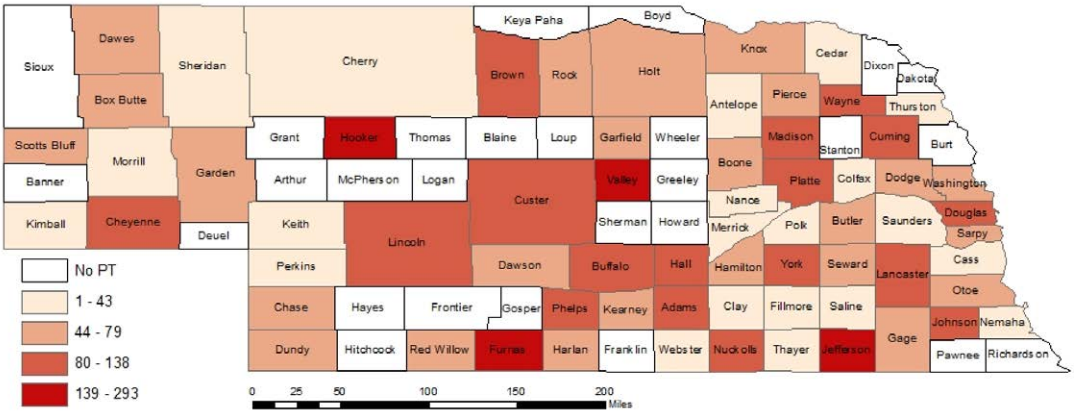


Figure 22. Number of licensed speech language pathologists per 100,000 population by county, Nebraska

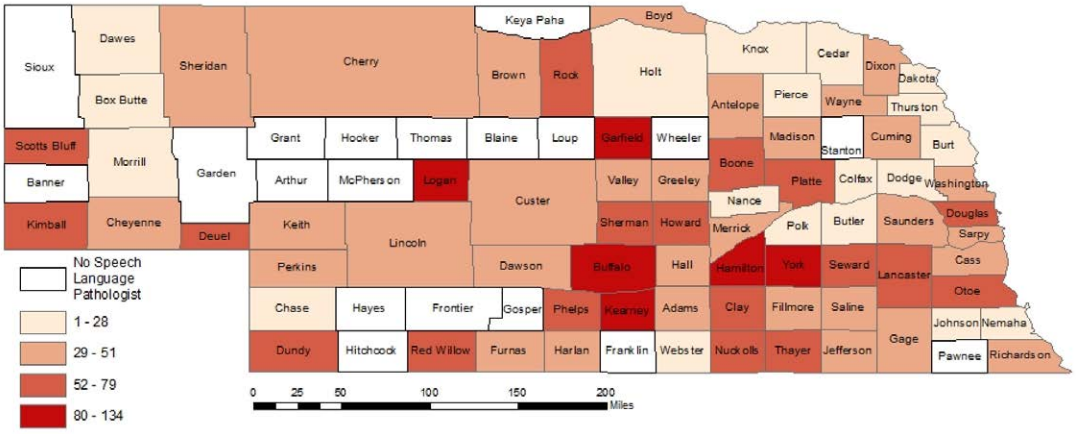


Figure 23. Number of licensed respiratory care practitioners per 100,000 population by county, Nebraska

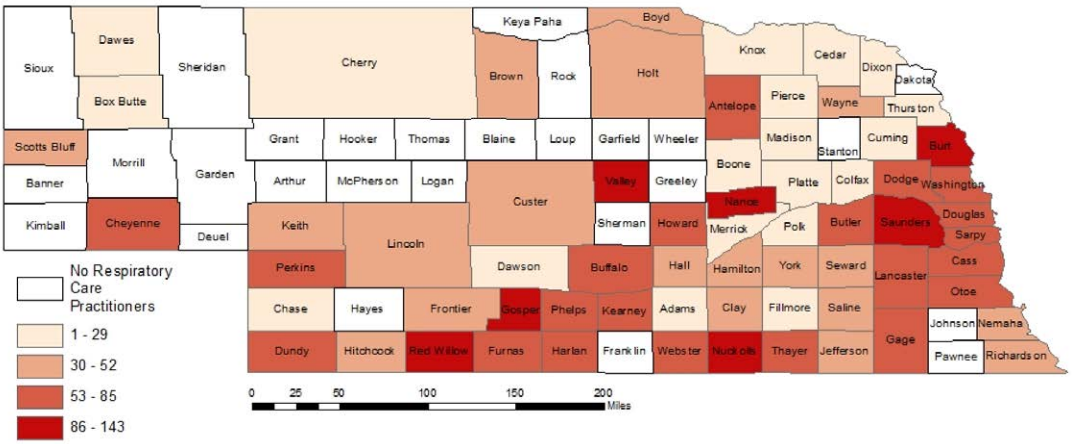


Figure 24. Number of licensed audiologists per 100,000 population by county, Nebraska

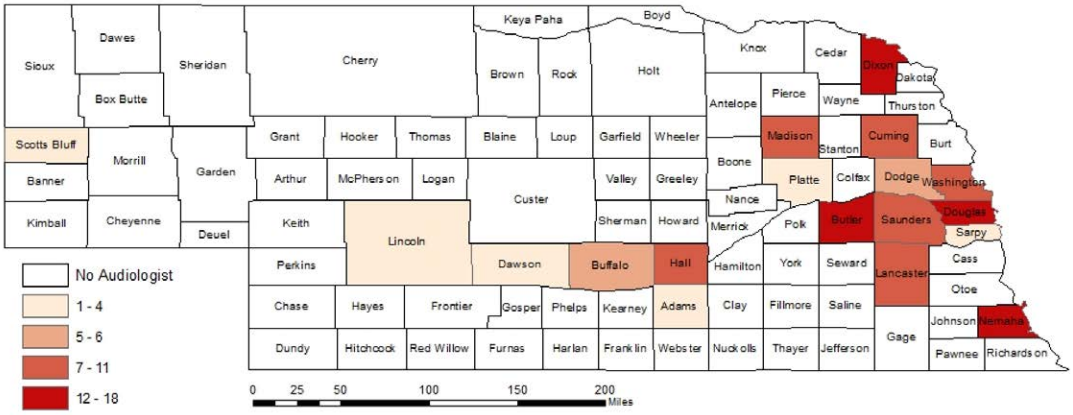


Figure 25. Number of licensed medical radiographers per 100,000 population by county, Nebraska

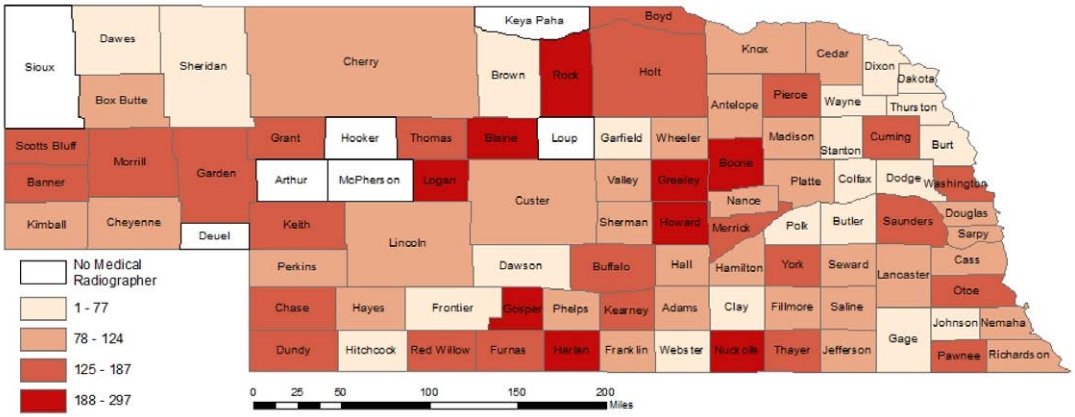
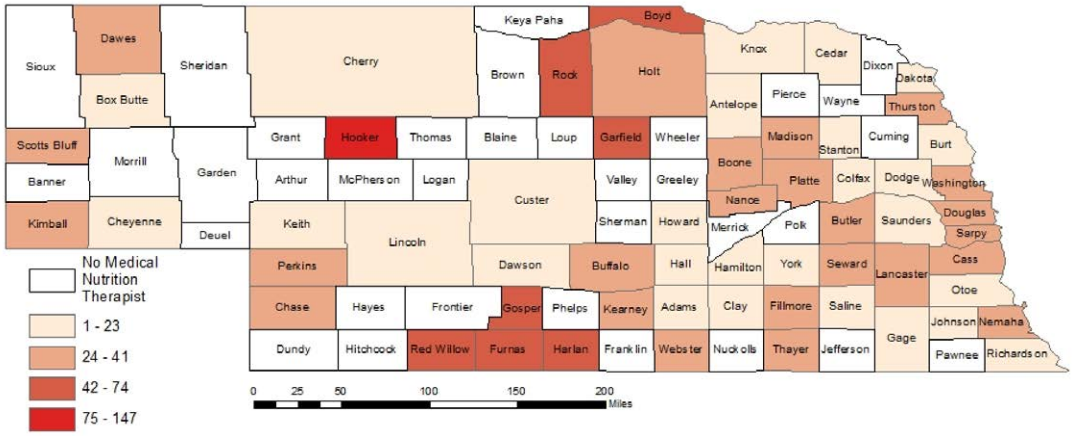


Figure 26. Number of licensed medical nutrition therapists per 100,000 population by county, Nebraska



OTHER NON-PHYSICIAN CLINICIANS

Other non-physician clinicians include chiropractors, podiatrists and optometrists. Their numbers and rates per 100,000 population for the State of Nebraska are provided below (Table 28). Our 2019 data show that there are 745 chiropractors, 107 podiatrists, and 435 optometrists practicing in Nebraska. This compares to 714 chiropractors, 108 podiatrists, and 430 optometrists in 2017.

Table 28. Number and rate per 100,000 population by type of licensed non-physician clinician

	2017		2019	
TYPE	N	RATE PER 100,000	N	RATE PER 100,000
Chiropractor	714	37.4	745	38.6
Podiatrist	108	5.7	107	5.5
Optometrist	430	22.5	435	22.5
Total	1,252	65.6	1,287	66.7

In terms of demographic distribution, chiropractors tend to be younger than either podiatrists or optometrists, with 13% of chiropractors aged less than 31 years old (Tables 29-31). However, in 2017, 17.8% of chiropractors were aged less than 31 years old. Chiropractors, podiatrists and optometrists are disproportionately male; the percentage of males are 72.4%, 83.2% and 61.8% for chiropractors, podiatrists and optometrists, respectively.

Table 29. Sex and age distribution of licensed chiropractors

	2017		2019	
	N	%	N	%
Sex				
Female	186	26.2	204	27.6
Male	525	73.8	536	72.4
Age in years**				
≤30	123	17.8	94	13.0
31-35	155	22.5	132	18.3
36-40	106	15.4	142	19.7
41-45	91	13.2	94	13.0
46-50	66	9.6	86	11.9
51-55	50	7.3	57	7.9
56-60	50	7.3	46	6.4
61-65	28	4.1	40	5.6
>65	21	3.0	30	4.2

*Sex was not reported for three chiropractors in 2017 and 5 in 2019.
**Age was not reported for 24 chiropractors in 2017 and 24 in 2019.

Table 30. Sex and age distribution of licensed podiatrists

	2017		2019	
	N	%	N	%
Sex				
Female	18	16.8	18	16.8
Male	89	83.2	89	83.2
Age in years**				
≤30	3	2.8	2	1.9
31-35	17	15.7	13	12.2
36-40	17	15.7	24	22.4
41-45	10	9.3	7	6.5
46-50	16	14.8	15	14.0
51-55	16	14.8	15	14.0
56-60	12	11.1	14	13.1
61-65	10	9.3	10	9.4
>65	7	6.5	7	6.5

Table 31. Sex and age distribution of licensed optometrists

	2017		2019	
	N	%	N	%
Sex				
Female	156	36.4	166	38.3
Male	273	63.6	268	61.8
Age in years**				
≤ 30	38	10.8	30	8.0
31-35	72	20.5	50	13.4
36-40	59	16.8	68	18.2
41-45	44	12.5	68	18.2
46-50	67	19.0	46	12.3
51-55	31	8.8	51	13.6
56-60	23	6.5	26	7.0
61-65	15	4.3	21	5.6
>65	3	0.9	14	3.7

*Sex was not reported for one optometrist in 2019.
**Age was not reported for 78 optometrists in 2017 and 61 in 2019.

IV. Summary and Recommendations

Since the 2018 report "The Status of the Healthcare Workforce in the State of Nebraska," the distribution of the healthcare workforce has slightly improved for certain healthcare professions. Still, shortage in healthcare workforce continues to challenge access to healthcare, particularly in rural areas.[14] For example, although the number of OB/GYN physicians decreased by only four physicians statewide, our data suggest there continues to be an increasing re-distribution of these physicians away from rural communities. There are also significantly fewer family medicine physicians in Nebraska since 2017; this number decreased from 894 in 2017 to 870 in 2019. However, the number of pediatric physicians increased by 16 physicians in the same period. Another concern is a decrease in EMTs from 6,961 in 2017 to 6,633 in 2019. Reasons for this decrease are unclear, though their demographic distribution continues to increase in age. In 2017, 19.2% of EMTs were aged 30 or younger; this compares to 17.7% in 2019.

Our updated results continue to highlight a persistent and substantial deficit in the supply of physicians and other healthcare professionals across rural Nebraska. In addition, most of the specialties examined in our report are increasing in average age. Among physicians, 9.2% are now aged 66 years and older compared to 8.3% in 2017. Physician assistants and nursing professionals continue to be critical in mitigating the decline in physician workforce or poor access to physicians in rural communities. This has been aided by policy initiatives such as Legislative Bill 107 (passed in 2015), which granted full practice authority to Nebraska nurse practitioners. This legislative change has significantly enhanced access to care in rural and underserved areas in Nebraska.[15] However, as in 2017, there remains substantial variation in the numbers and rates of nurse professionals across the state, with relatively low numbers of RNs, LPNs and APRNs in west and central Nebraska.

Among other health professions, the supply of dental hygienists has increased significantly in Nebraska since 2017, reaching 1,423 dental hygienists in 2019 vs. 1,366 in 2017. The number of dentists increased slightly by 8 dentists, but their per capita rate decreased in 2017-2019 period. The number of pharmacists decreased from 2,066 in 2017 to 2,048 in 2019; however, the number of pharmacy technicians increased by 83 during the same time period. Although EMTs are distributed widely throughout Nebraska, there has been a significant decrease of 328 EMTs from 2017 to 2019. Other allied health professionals have experienced increases in number for this period of time.

In summary, there continue to be significant challenges in the distribution of the healthcare workforce in the State of Nebraska, with increasing reliance on non-physician workforce such as nursing professionals in many rural communities. However, the per capita rates of healthcare professionals remain low in much of rural western Nebraska. The delivery of comprehensive, high quality, team-based care for complex health conditions is challenging in rural communities. Many times, these rural communities have limited or no access to key healthcare specialists, baccalaureate-prepared RNs and other nurse professionals who are needed for proper case management of patients with chronic conditions and complex co-morbidities. In addition to geographical disparities in access to care, future challenges include a large percentage of the physician workforce that is nearing retirement.

14 Wilson FA, Wehbi NK, Larson J, et al. The Status of the Healthcare Workforce in the State of Nebraska.

15 American Association of Nurse Practitioners. Nurse Practitioners Salute Nebraska for New Health Care Law. Available at: https://www.aanp.org/press-room/166-press-room/2015-press-releases/1689-nurse-practitioners-salute-nebraska-for-new-health-care-law. Accessed January 15, 2018.

Based on our updated findings, we provide the following recommendations:

1. **Enhance existing pipeline programs and educational initiatives that incentivize individuals from rural areas to become healthcare professionals and practice healthcare in rural and underserved urban communities, particularly for health professions exhibiting significant shortages.**

   Existing pipeline programs include statewide AHEC programs, the Rural Health Opportunities Program (RHOP), the Kearney Health Opportunities Program (KHOP), the Public Health Early Admissions Student Track (PHEAST), the Rural Pharmacy Practice Educational Initiative (RPPEI), and the UNMC Department of Family Medicine Rural Training Track (RTT). These programs apply a "Grow Your Own" approach that recruit, educate and graduate leaders from Nebraska who are committed to returning to rural areas of the state to practice healthcare. These programs represent a commitment and dedication to developing a health workforce that will enhance patient care in rural and underserved areas and improve healthcare access and health equity. Developing strong and diverse pipeline programs is one way to ensure increased availability of future healthcare professionals that are well-prepared to meet the unique needs of rural Nebraska.

   Opportunities to enhance the engagement of communities and providers in order to offer adequate community-based clinical training and service learning opportunities should be explored. Using 3D technology, augmented reality, simulation and other technologies, e-learning initiatives such as UNMC's Interprofessional Experiential Center for Enduring Learning (iEXCEL) and the iWalls at the UNMC campuses statewide have strong promise in transforming the learning environment and attracting health professions trainees to Nebraska.

2. **Enhance the availability of scholarships and student loan repayment programs for health professions students and practitioners at all levels as a means for recruiting and retaining those professionals interested in serving in rural and underserved urban areas of Nebraska.**

   Despite state funding and generous philanthropic support, students continue to have unmet financial needs. Scholarships could be structured in ways that encourage students to remain in Nebraska after their training programs.

   Student loan repayment programs serve as powerful recruitment and retention tool for health professionals in identified shortage areas. Evidence shows that state and federal incentive programs positively influence the retention of family medicine providers in rural and small town areas of Nebraska.[16] Currently, the funding available to support Nebraska Loan Repayment Programs is inadequate to recruit and retain the health workforce needed in shortage areas across Nebraska.

16 For discussion of this literature refer to Pedley, A. Analyzing the Impact of Incentive Programs on Retention of Family Practice Providers in Rural Nebraska. July 2018.

3. **Increase the number of medical residency training positions in Nebraska.**

   Literature has shown that 54.6% of physicians completing residency stay in the state in which that training has occurred.[17] In order to increase the number of physicians practicing in Nebraska, an increase in the number of medical residency training positions is recommended. To enhance the likelihood that physicians will practice in identified shortage areas in rural Nebraska, new residency training positions should involve significant training in rural areas of the state.

   State and local entities should be encouraged to partner in order to expand such training programs and ensure the expertise and financial resources are available to support additional residency training positions.

4. **Expand the capacity of the telecommunication infrastructure to support the adoption and utilization of telehealth as a means for improving access to healthcare, particularly in rural and underserved areas.**

   A large body of literature has shown that telehealth technologies can be effective in increasing access to a range of healthcare services in remote areas without compromising the quality of these services.[18] This is especially important for the healthcare specialties in rural and underserved locations. Although some aspects of telehealth delivery may be low-cost to providers, other technologies such as secure remote patient monitoring or robotic technologies may be too expensive for rural critical access hospitals or clinics to support. Subsidy programs that offset telehealth investment costs and expand broadband capacity should be explored.

5. **Develop innovative training and healthcare delivery solutions and related policy interventions to mitigate the gaps in healthcare access due to health profession shortages.**

   In comparison to 2017, our report identifies healthcare professions that have experienced significant decreases in just a two-year period. This includes EMTs which exhibited a nearly 5% decrease since 2017. The primary care physician workforce continues to shrink in number, and the geographical distribution of these specialties, especially OB/GYN physicians, is a cause of concern. The speed of these changes within the short study time period highlights the need to quickly identify and implement feasible training and healthcare delivery solutions and related policy interventions to support successful implementation, like the Simulation in Motion – Nebraska (SIM-NE) training program for EMS providers. Otherwise, the gap between addressing the needs and the supply of these healthcare professionals, particularly in rural communities, will become critically wide in the near future.

17 Association of American Medical Colleges. Report on Residents Executive Summary. December 2019.

18 For a discussion of this literature, refer to Wilson FA, Rampa S, et al. Reimbursements for telehealth services are likely to be lower than non-telehealth services in the United States. J Telemed Telecare 2017;23(4):497-500; and Wilson FA, Rampa S, et al. An exploration of telehealth delivery for mental health services based on analysis of private insurance claims data in the US. Psychiatr Serv. Epub ahead of print.

6. **Perform targeted, ongoing data collection to monitor the healthcare workforce and forecast future needs and requirements.**

   Although our report provides an illustration of the current distribution of the healthcare workforce for the state, this analysis is a single snapshot in time. It does not take into account demographic and population health trends that re-shape and expand the need for certain healthcare professionals. Similarly, the current analysis does not examine what the state of the healthcare profession may look like based on past and current trends in providers' demographics, geographical location, specialties, retirements, and other factors. Information on the likely future intersection of these two components, population health needs and supply of professionals to meet these needs, is crucial for workforce planning to identify emergent shortage areas and provide a more efficient and timely allocation of resources to address these areas. In fact, the Health Resources and Services Administration (HRSA) projects that there will be a shortfall of 5,320 full-time equivalent primary care physicians within the Midwest region by the year 2025.[19] The magnitude of this shortfall for Nebraska is unknown. Thus, a forecasting model should be developed and updated annually with new workforce data. This model would provide ongoing assessment of healthcare disciplines and specialties and take into consideration the new healthcare delivery models that promote team-based care, the large number of healthcare professionals who are near retirement age, and the potential demand for healthcare services due to expanded insurance coverage and an older population. A forecasting model is crucial in determining access to healthcare for Nebraskans in the future.

7. **Establish and streamline existing public-private partnerships aimed at healthcare workforce education, development and healthcare delivery.**

   New community partnerships with educational institutions at all levels, local and state government, healthcare systems and other community organizations are needed as Nebraska's healthcare and health workforce needs change.

   For instance, partnerships between educational institutions and clinical agencies are vital to economic and workforce development and have yielded access to clinical rotations, preceptors and assistance with recruitment and marketing of all health workforce training programs. Public-private partnerships have proven effective for funding capital, programmatic, and community-based initiatives.

   Establishing and streamlining partnerships will also reduce duplication that often arises due to lack of awareness of ongoing workforce development activities. Interdisciplinary, team-based approaches to education and training may be one way to reduce the communication gap and redundancy and to develop more collaborative efforts among partners.

19 National Center for Health Workforce Analysis. Health Resources and Services Administration. National and regional projections of supply and demand for primary care practitioners: 2013-2025. November 2016. US Department of Health and Human Services. Rockville, Maryland.

Appendix A: Demographic Profile of the State of Nebraska

Table A1. Sex, race/ethnicity and age distribution of Nebraska population in 2018, U.S. Census Bureau[20]

	%
Sex	
Female	50.1
Male	49.9
Race/ethnicity	
White, non-Hispanic	78.6
Black/African American	5.1
Hispanic/Latino	11.2
Asian	2.7
American Indian/Alaska Native	1.5
Native Hawaiian/Other Pacific Islander	0.1
Other	0.8
Age in years	
<18	24.7
18-64	59.6
>=65	15.7

20 U.S. Census Bureau. Quick Facts. Nebraska population estimates.

Appendix B: State of Nebraska Designated Health Professions Shortage Areas

Table B1. State designated shortage areas for primary care medical professions by county**

County	Family Practice	Internal Medicine	Pediatrics	Obstetrics & Gynecology	General Surgery
Adams	No	Yes	No	Yes	No
Antelope	Yes	Yes	Yes	Yes	Yes
Arthur	Yes	Yes	Yes	Yes	Yes
Banner	Yes	Yes	Yes	Yes	Yes
Blaine	Yes	Yes	Yes	Yes	Yes
Boone	No	Yes	No	Yes	Yes
Box Butte	Yes	Yes	Yes	Yes	Yes
Boyd	No	Yes	Yes	Yes	Yes
Brown	Yes	Yes	Yes	Yes	Yes
Buffalo	No	Yes	Yes	No	No
Burt	Yes	Yes	Yes	Yes	Yes
Butler	No	Partial	Partial	Partial	Partial
Cass	No	Partial	Partial	Partial	Partial
Cedar	Yes	Yes	Yes	Yes	Yes
Chase	Yes	Yes	Yes	Yes	Yes
Cherry	Yes	Yes	Yes	Yes	No
Cheyenne	Yes	Yes	Yes	Yes	No
Clay	Yes	Yes	Yes	Yes	Yes
Colfax	Yes	Yes	Yes	Yes	Yes
Cuming	No	Yes	Yes	Yes	No
Custer	Yes	Yes	Yes	Yes	Yes
Dakota	No	Yes	Yes	Yes	Yes
Dawes	Yes	Yes	Yes	Yes	Yes
Dawson	No	Yes	Yes	Yes	Yes
Deuel	Yes	Yes	Yes	Yes	Yes
Dixon	Yes	Yes	Yes	Yes	Yes
Dodge	No	Partial	Partial	No	Partial
Douglas	No	No	No	No	No
Dundy	Yes	Yes	Yes	Yes	Yes
Fillmore	No	Yes	Yes	Yes	Yes
Franklin	Yes	Yes	Yes	Yes	Yes
Frontier	Yes	Yes	Yes	Yes	Yes
Furnas	Yes	Yes	Yes	Yes	Yes
Gage	No	Partial	Partial	No	Partial
Garden	Yes	Yes	Yes	Yes	Yes
Garfield	Yes	Yes	Yes	Yes	Yes
Gosper	Yes	Yes	Yes	Yes	Yes
Grant	Yes	Yes	Yes	Yes	Yes
Greeley	Yes	Yes	Yes	Yes	Yes

County	Family Practice	Internal Medicine	Pediatrics	Obstetrics & Gynecology	General Surgery
Hall	No	Yes	No	Yes	Yes
Hamilton	Yes	Yes	Yes	Yes	Yes
Harlan	Yes	Yes	Yes	Yes	Yes
Hayes	Yes	Yes	Yes	Yes	Yes
Hitchcock	Yes	Yes	Yes	Yes	Yes
Holt	Yes	Yes	Yes	Yes	Yes
Hooker	No	Yes	Yes	Yes	Yes
Howard	No	Yes	Yes	Yes	Yes
Jefferson	Yes	Yes	Yes	Yes	Yes
Johnson	Partial	Partial	Partial	Partial	Partial
Kearney	Yes	Yes	Yes	Yes	Yes
Keith	Yes	Yes	Yes	Yes	No
Keya Paha	Yes	Yes	Yes	Yes	Yes
Kimball	Yes	Yes	Yes	Yes	Yes
Knox	No	Yes	Yes	Yes	Yes
Lancaster	No	No	No	No	No
Lincoln	No	Yes	Yes	No	No
Logan	Yes	Yes	Yes	Yes	Yes
Loup	Yes	Yes	Yes	Yes	Yes
McPherson	Yes	Yes	Yes	Yes	Yes
Madison	No	Yes	No	No	No
Merrick	Yes	Yes	Yes	Yes	Yes
Morrill	Yes	Yes	Yes	Yes	Yes
Nance	Yes	Yes	Yes	Yes	Yes
Nemaha	No	Yes	Yes	Yes	Yes
Nuckolls	Yes	Yes	Yes	Yes	Yes
Otoe	No	Partial	Partial	Partial	Partial
Pawnee	No	Yes	Yes	Yes	Yes
Perkins	No	Yes	Yes	Yes	No
Phelps	No	Yes	Yes	Yes	Yes
Pierce	Yes	Yes	Yes	Yes	Yes
Platte	No	Yes	Yes	Yes	Yes
Polk	Yes	Yes	Yes	Yes	Yes
Red Willow	No	Yes	Yes	Yes	Yes
Richardson	Yes	Yes	Yes	Yes	Yes
Rock	Yes	Yes	Yes	Yes	Yes
Saline	Partial	Partial	Partial	Partial	Partial
Sarpy	No	No	No	No	No
Saunders	No	Partial	Partial	Partial	Partial
Scotts Bluff	No	Yes	Yes	No	Yes
Seward	No	Partial	Partial	Partial	Partial
Sheridan	Yes	Yes	Yes	Yes	Yes
Sherman	Yes	Yes	Yes	Yes	Yes

County	Family Practice	Internal Medicine	Pediatrics	Obstetrics & Gynecology	General Surgery
Sioux	Yes	Yes	Yes	Yes	Yes
Stanton	Yes	Yes	Yes	Yes	Yes
Thayer	Yes	Yes	Yes	Yes	Yes
Thomas	Yes	Yes	Yes	Yes	Yes
Thurston	Yes	Yes	Yes	Yes	Yes
Valley	No	Yes	Yes	Yes	Yes
Washington	No	Partial	Partial	Partial	Partial
Wayne	Yes	Yes	Yes	Yes	Yes
Webster	Yes	Yes	Yes	Yes	Yes
Wheeler	Yes	Yes	Yes	Yes	Yes
York	Yes	Yes	Yes	Yes	No

*Partial means a part of the county is a designated shortage area
**Data from State of Nebraska Department of Health and Human Services Office of Rural Health Rural Health Advisory Commission.[21]

21 Office of Rural Health. Nebraska Department of Health & Human Services. State and federal shortage areas.

Table B2. State designated shortage areas for dentistry, pharmacy and allied health professions by county**

County	General Dentist	Pharmacist	Occupational Therapist	Physical Therapist
Adams	No	No	No	No
Antelope	Yes	No	Yes	No
Arthur	Yes	Yes	Yes	Yes
Banner	Yes	Yes	Yes	Yes
Blaine	Yes	Yes	Yes	Yes
Boone	No	No	No	No
Box Butte	No	No	Yes	No
Boyd	Yes	Yes	Yes	Yes
Brown	Yes	Yes	No	No
Buffalo	No	No	No	No
Burt	Partial	Yes	No	No
Butler	Partial	Partial	No	No
Cass	No	Partial	No	No
Cedar	Yes	Yes	No	No
Chase	Yes	Yes	Yes	No
Cherry	No	Yes	Yes	No
Cheyenne	Yes	No	No	No
Clay	Yes	Yes	Yes	Yes
Colfax	Partial	Yes	Partial	No
Cuming	Partial	No	No	No
Custer	Yes	No	No	No
Dakota	Yes	Yes	Yes	Yes
Dawes	No	No	Yes	No
Dawson	No	Yes	No	No
Deuel	No	Yes	No	Yes
Dixon	No	Yes	Yes	Yes
Dodge	No	No	No	No
Douglas	No	No	No	No
Dundy	No	Yes	Yes	No
Fillmore	Partial	Yes	No	Partial
Franklin	Yes	Yes	Yes	Yes
Frontier	Yes	Yes	Yes	No
Furnas	Yes	No	No	No
Gage	No	No	No	No
Garden	No	Yes	Yes	No
Garfield	No	Yes	No	No
Gosper	Yes	Yes	Yes	Yes
Grant	Yes	Yes	Yes	Yes
Greeley	Yes	Yes	Yes	Yes
Hall	No	No	No	No
Hamilton	Yes	Yes	No	No
Harlan	Yes	Yes	No	No

County	General Dentist	Pharmacist	Occupational Therapist	Physical Therapist
Hayes	Yes	Yes	Yes	Yes
Hitchcock	Yes	Yes	Yes	Yes
Holt	No	No	Yes	No
Hooker	Yes	Yes	Yes	No
Howard	Yes	No	Yes	No
Jefferson	Partial	No	No	No
Johnson	Partial	No	No	No
Kearney	No	Yes	Yes	No
Keith	No	Yes	Yes	No
Keya Paha	Yes	Yes	Yes	Yes
Kimball	Yes	Yes	Yes	No
Knox	No	Yes	No	No
Lancaster	No	No	No	No
Lincoln	No	No	Yes	No
Logan	Yes	Yes	Yes	Yes
Loup	Yes	Yes	Yes	Yes
McPherson	Yes	Yes	Yes	Yes
Madison	No	No	No	No
Merrick	Yes	No	Yes	Yes
Morrill	Yes	Yes	Yes	No
Nance	Yes	Yes	Yes	Yes
Nemaha	Partial	No	Partial	No
Nuckolls	Yes	Yes	No	No
Otoe	No	No	Yes	No
Pawnee	Partial	Yes	No	No
Perkins	Yes	Yes	Yes	No
Phelps	No	No	No	No
Pierce	Yes	Yes	Yes	No
Platte	No	No	No	No
Polk	Partial	No	Partial	No
Red Willow	No	No	No	No
Richardson	No	Yes	No	No
Rock	Yes	Yes	No	No
Saline	Yes	No	No	No
Sarpy	No	No	No	No
Saunders	No	Partial	No	No
Scotts Bluff	No	No	No	No
Seward	No	Partial	No	No
Sheridan	Yes	Yes	Yes	Yes
Sherman	Yes	Yes	Yes	No
Sioux	Yes	Yes	Yes	Yes

County	General Dentist	Pharmacist	Occupational Therapist	Physical Therapist
Stanton	Yes	Yes	Yes	Yes
Thayer	Partial	Yes	No	No
Thomas	Yes	Yes	Yes	Yes
Thurston	No	No	No	No
Valley	No	No	Yes	No
Washington	No	Partial	No	No
Wayne	No	Yes	No	No
Webster	Yes	No	Yes	No
Wheeler	Yes	Yes	Yes	Yes
York	No	No	No	No

*Partial means a part of the county is a designated shortage area
**Data from State of Nebraska Department of Health and Human Services Office of Rural Health Rural Health Advisory Commission.[22]

22 Office of Rural Health. Nebraska Department of Health & Human Services. State and federal shortage areas.

Appendix C: State of Nebraska Guidelines for Designated Health Profession Shortage Areas[23]

State of Nebraska Guidelines for Designation of Family Practice Shortage Areas

1. A service area may be a single county, a partial county, a group of contiguous counties, or an identified population group within a defined area.
2. In computing the population-to-physician ratio, physicians practicing family or general practice will be counted on a full-time equivalent (FTE) basis, with four hours counting as 0.1 FTE. Physicians will not be counted if they are practicing under Medicare, Medicaid, or licensure sanction, or if they have documented plans to discontinue practice within one year. Physicians will not be counted if they no longer have hospital and/or nursing home privileges in the county or service area for the area they serve.

   If the population to FTE ratio is greater than the population of the service area, the population of the service area will be entered as the ratio. The Rural Health Advisory Commission will review individual concerns about full employment of a service area.
3. Service areas will be designated if there is no physician coverage or if the population-to-physician ratio equals or exceeds 2,000/1.
4. Service areas with a population-to-physician ratio at or between 1,500/1 - 1,999/1 will be designated if at least one of the following high need indicators is present:
   A. The proportion of the population that is 65+ ranks in the highest quartile of the state;
   B. The proportion of the population below the poverty level ranks in the highest quartile of the state;
   C. The infant mortality rate ranks in the highest quartile of the state;
   D. The low birth weight rate ranks in the highest quartile of the state;
   E. More than half of the area's physicians are over 60 years old;
   F. The area is a frontier area (fewer than six persons per square mile.)
5. Counties having a population greater than or equal to fifteen thousand inhabitants and/or included within a metropolitan statistical area as defined by the United States Department of Commerce, Bureau of the Census will not be designated. Special populations and/or facilities may be designated within these counties. Areas within a 25-mile radius of Lincoln and Omaha will not be designated.
6. Service areas designated as federal primary care Health Professional Shortage Area (HPSA) may be designated as state family practice shortage areas for purposes of the Nebraska Rural Health Incentive Programs, if requested by the community and/or clinic and approved by the Rural Health Advisory Commission.
7. The designation of an area will not be withdrawn if a student loan recipient or loan repayment applicant has chosen the area as a future practice site.

23 Office of Rural Health. Nebraska Department of Health & Human Services. Nebraska state-designated shortage area guidelines. Available at: http://dhhs.ne.gov/publichealth/RuralHealth/Documents/ShortageAreaGuidelines.pdf.

Guidelines for Designation of Shortage Areas in General Surgery, Internal Medicine, Obstetrics/Gynecology, Pediatrics, and Psychiatry

1. A service area may be a single county or a group of contiguous counties.
2. In computing the population-to-physician ratio, physicians practicing a particular specialty will be counted on a full-time equivalent (FTE) basis, with four hours counting as 0.1 FTE. Physicians will not be counted if they are practicing under Medicare, Medicaid, or licensure sanction, or if they have documented plans to discontinue practice within one year. Psychiatrists working exclusively in an inpatient setting will not be counted.

   If the population to FTE ratio is greater than the population of the service area, the population of the service area will be entered as the ratio. The Rural Health Advisory Commission will review individual concerns about full employment of a service area.
3. Service areas will be designated as shortage areas for a particular specialty if there is no local physician coverage in that specialty or if the population-to-specialist ratio equals or exceeds:

General Surgery	10,200/1
General Internal Medicine	3,250/1
Obstetrics/Gynecology	10,000/1
General Pediatrics	9,300/1
Psychiatry	10,000/1

4. Except as defined in 1 above, areas within a 25-mile radius of Lincoln and Omaha will not be designated.
5. The designation of an area will not be withdrawn if a student loan recipient or loan repayment applicant has chosen the area as a future practice site.

Guidelines for Designation of Physician Assistant Shortage Areas

1. A service area may be a single county or a group of contiguous counties.
2. Service areas will be designated as physician assistant shortage areas if there is no local physician coverage or if the population-to-physician ratio equals or exceeds the guideline for the specialty of the collaborating physician.
3. Except as defined in 1 above, areas within a 25-mile radius of Lincoln and Omaha will not be designated.
4. The designation of an area will not be withdrawn if a student loan recipient or loan repayment applicant has chosen the area as a future practice site.

Guidelines for Designation of Nurse Practitioner Shortage Areas

1. A service area may be a single county or a group of contiguous counties.
2. Service areas will be designated as nurse practitioner shortage areas if there is no local physician coverage or if the population-to-physician ratio equals or exceeds the guideline for the specialty.
3. Except as defined in 1 above, areas within a 25-mile radius of Lincoln and Omaha will not be designated.
4. The designation of an area will not be withdrawn if a loan repayment applicant has chosen the area as a future practice site.

Guidelines for Designation of General Dentistry

Shortage Areas

1. A service area may be a single county, a partial county, a group of contiguous counties, or an identified population group within a defined area.
2. The designation of a service area as a General Dentistry Shortage Area will be based on the ratio of service area population to full-time equivalency (FTE) of general dentists in the service area. In computing the population-to-dentist ratio, dentists will be counted on a full-time equivalent basis, with four hours counting as 0.1 FTE. Dentists will not be counted if they are practicing under Medicare, Medicaid, or licensure sanction, or if they have documented plans to discontinue practice within one year.

   If the population to FTE ratio is greater than the population of the service area, the population of the service area will be entered as the ratio. The Rural Health Advisory Commission will review individual concerns about full employment of a service area.
3. A service area is designated as a General Dentistry Shortage Area if there is no dentist in the service area or if the population-to-dentist ratio equals or exceeds 3000:1.
4. Service areas with a population-to-dentist ratio at or between 2500/1 - 2999/1 will be designated if at least one of the following high need indicators is present:
   a. Half or more of the dentists serving the area are 55 or older;
   b. The proportion of the population below the poverty level ranks in the highest quartile of the state; or
   c. The area is a frontier area (fewer than six persons per square mile).
5. Except as defined in 1 above, areas within a 50-mile radius of Lincoln and Omaha will not be designated.
6. Service areas designated as federal general dentistry Health Professional Shortage Area (HPSA) may be designated as state general dentistry shortage areas for purposes of the Nebraska Rural Health Incentive Programs, if requested by the community and/or clinic and approved by the Rural Health Advisory Commission.
7. The designation of an area will not be withdrawn if a student loan recipient or loan repayment applicant has chosen the area as a future practice site.

Guidelines for Designation of Pharmacist Shortage Areas

1. A service area may be a single county or a group of contiguous counties.
2. The designation of a service area as a Pharmacist Shortage Area will be based on the ratio of service area population to full-time equivalency (FTE) of pharmacists practicing in the service area. In computing the population to pharmacist ratio, pharmacists will be counted on a full-time equivalent basis, with four hours counting as 0.1 FTE. Pharmacists will not be counted if they are practicing under Medicare, Medicaid, or licensure sanction, or if they have documented plans to discontinue practice within one year.

   If the population to FTE ratio is greater than the population of the service area, the population of the service area will be entered as the ratio. The Rural Health Advisory Commission will review individual concerns about full employment of a service area.
3. A service area is designated as a Pharmacist Shortage Area if there is no pharmacist in the service area or if the population-to-pharmacist ratio equals or exceeds 1700:1.
4. Service areas with a population-to-pharmacist ratio at or between 600/1 - 1699/1 will be designated if the proportion of the service area population 65 and older ranks in the highest quartile of the state or if more than half of the area's pharmacists are over 60 years old.
5. Except as defined in 1 above, areas within a 25-mile radius of Lincoln and Omaha will not be designated. Cities larger than 15,000 will not be designated.
6. The designation of an area will not be withdrawn if a loan repayment applicant has chosen the area as a future practice site.

Guidelines for Designation of Occupational Therapy Shortage Areas

1. A service area may be a single county or a group of contiguous counties.
2. In computing the population-to-occupational therapist (OT) ratio, OTs will be counted on a full-time equivalent (FTE) basis, with four hours counting as 0.1 FTE. OTs will not be counted if they are practicing under Medicare, Medicaid, or licensure sanction, or if they have documented plans to discontinue practice within one year.

   If the population-to-OT ratio is greater than the population of the service area, the population of the service area will be entered as the ratio. The Rural Health Advisory Commission will review individual concerns about full employment of a service area.
3. A service area is designated as an Occupational Therapist Shortage Area if there is no Occupational Therapist practicing in the service area or if the population-to-OT ratio equals or exceeds 5000/1.
4. Service areas with a population-to-OT ratio at or between 4500/1 - 4999/1 will be designated if at least one of the following high need indicators is present:
   a. The area is a frontier area (fewer than six persons per square mile);
   b. The proportion of the service area population 65 and older ranks in the highest quartile of the state;
   c. The proportion of the service area Special Education students to the student population ranks in the highest quartile of the state;
   d. The proportion of the service area population below the poverty level ranks in the highest quartile of the state; or
   e. Fifty percent or more of the OTs practicing in the county are 60 or older.
5. Except as defined in 1 above, areas within a 50-mile radius of Lincoln and Omaha will not be designated.
6. The designation of an area will not be withdrawn if a loan repayment applicant has chosen the area as a future practice site.

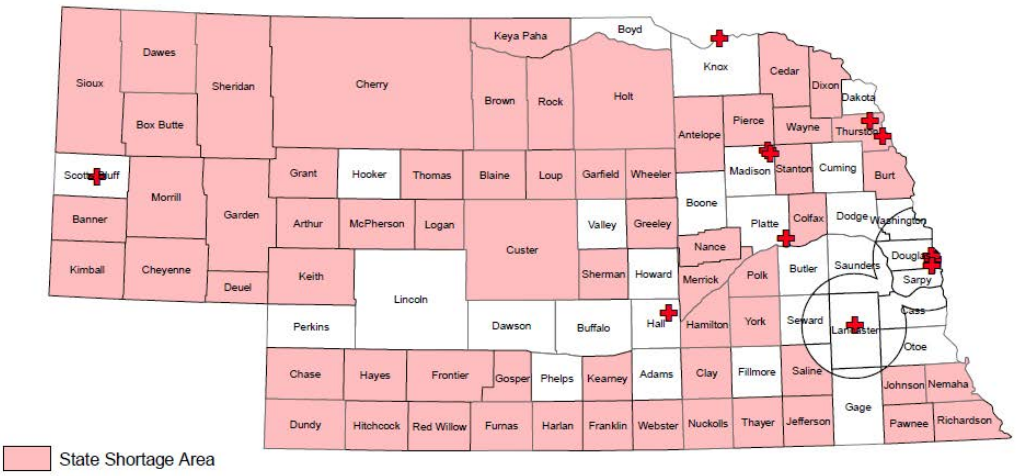
Guidelines for Designation of Physical Therapy Shortage Areas

1. A service area may be a single county or a group of contiguous counties.
2. In computing the population-to-physical therapist (PT) ratio, PTs will be counted on a full-time equivalent (FTE) basis, with four hours counting as 0.1 FTE. PTs will not be counted if they are practicing under Medicare, Medicaid, or licensure sanction, or if they have documented plans to discontinue practice within one year.

   If the population to licensed PT ratio is greater than the population of the service area, the population of the service area will be entered as the ratio. The Rural Health Advisory Commission will review individual concerns about full employment of a service area.
3. A service area is designated as a Physical Therapy Shortage Area if there is no physical therapist practicing in the service area or if the population-to-PT ratio equals or exceeds 5000/1.
4. Service areas with a population-to-PT ratio at or between 4500/1 - 4999/1 will be designated if at least one of the following high need indicators is present:
   a. The area is a frontier area (fewer than six persons per square mile);
   b. The proportion of the service area population 65 and older ranks in the highest quartile of the state;
   c. The proportion of the service area Special Education students to the student population ranks in the highest quartile of the state;
   d. The proportion of the service area population below the poverty level ranks in the highest quartile of the state; or
   e. Fifty percent or more of the PTs practicing in the county are 60 or older.
5. Except as defined in 1 above, areas within a 50-mile radius of Lincoln and Omaha will not be designated.
6. The designation of an area will not be withdrawn if a loan repayment applicant has chosen the area as a future practice site.

Appendix D: State-Designated Shortage Area Maps[24]

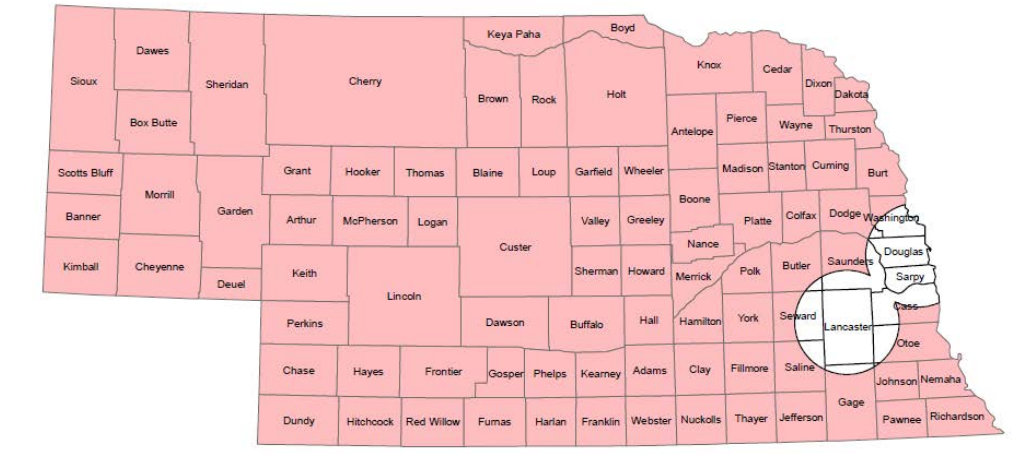
Figure D1. State designated shortage areas for family practice



Source: Rural Health Advisory Commission
DHHS - Nebraska Office of Rural Health
Statewide Review: 2019
Last Updated: April 2019
Location: K: RURAL_HEALTH > Rural Health Intern > State Shortage Areas 2019
Data File Location: K: RURAL_HEALTH > Rural Health Intern > State Shortage Areas 2019 > Excel files > Copy of HPTS hours for SDMS - FM

Cartography: Ryan Ossell | Community and Regional Planning Intern | DHHS
For: Thomas Rauner | Primary Care Office Director
thomas.rauner@nebraska.gov | 402-471-0148

Figure D2. State designated shortage areas for general internal medicine

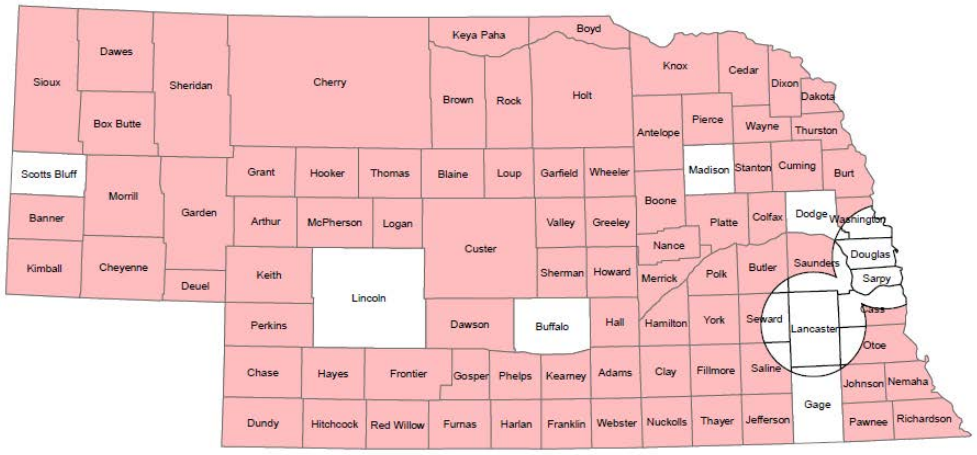


Source: Rural Health Advisory Commission
DHHS - Nebraska Office of Rural Health
Statewide Review: 2019
Last Updated: April 2019
Location: K: RURAL_HEALTH > Rural Health Intern > State Shortage Areas 2019
Data File Location: K: RURAL_HEALTH > Rural Health Intern > State Shortage Areas 2019 > Excel files > Copy of HPTS hours for SDMS - IM

Cartography: Ryan Ossell | Community and Regional Planning Intern | DHHS
For: Thomas Rauner | Primary Care Office Director
thomas.rauner@nebraska.gov | 402-471-0148

24 Office of Rural Health. Nebraska Department of Health & Human Services. State and federal shortage areas.

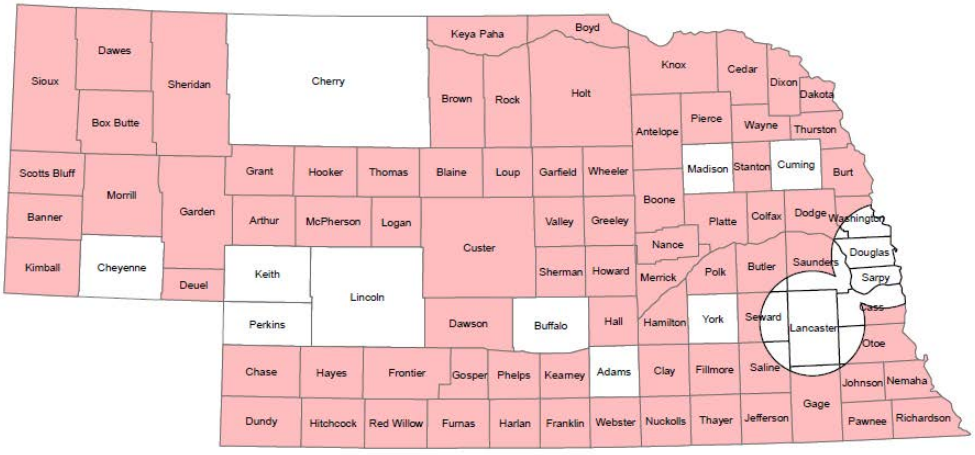
Figure D3. State designated shortage areas for obstetrics and gynecology



Source: Rural Health Advisory Commission
DHHS - Nebraska Office of Rural Health
Statewide Review: 2019
Last Updated: April 2019
Location: K: RURAL_HEALTH > Rural Health Intern > State Shortage Areas 2019
Data File Location: K: RURAL_HEALTH > Rural Health Intern > State Shortage Areas 2019 > Excel files > Copy of HPTS hours for SDMS - OB GYN

Cartography: Ryan Ossell | Community and Regional Planning Intern | DHHS
For: Thomas Rauner | Primary Care Office Director
thomas.rauner@nebraska.gov | 402-471-0148

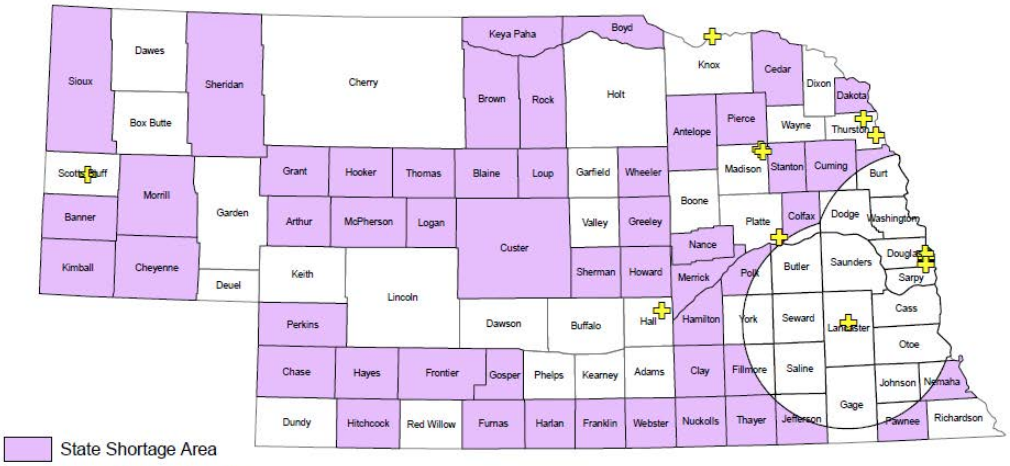
Figure D4. State designated shortage areas for general surgery



Source: Rural Health Advisory Commission
DHHS - Nebraska Office of Rural Health
Statewide Review: 2019
Last Updated: April 2019
Location: K: RURAL_HEALTH > Rural Health Intern > State Shortage Areas 2019
Data File Location: K: RURAL_HEALTH > Rural Health Intern > State Shortage Areas 2019 > Excel files > Copy of HPTS hours for SDMS - General Surgery

Cartography: Ryan Ossell | Community and Regional Planning Intern | DHHS
For: Thomas Rauner | Primary Care Office Director
thomas.rauner@nebraska.gov | 402-471-0148

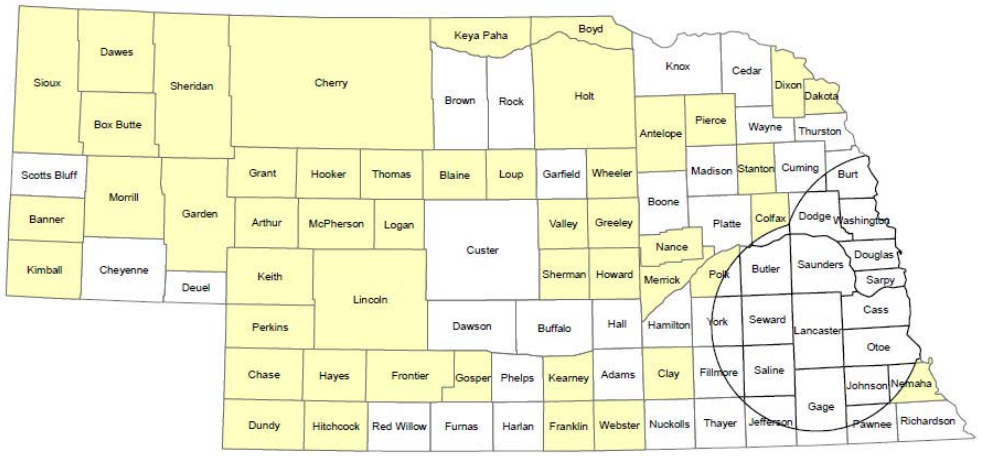
Figure D5. State designated shortage areas for general dentistry



Source: Rural Health Advisory Commission
DHHS - Nebraska Office of Rural Health
Statewide Review: 2019
Last Updated: April 2019
Location: K: RURAL_HEALTH > Rural Health Intern > State Shortage Areas 2019
Data File Location: K: RURAL_HEALTH > Rural Health Intern > State Shortage Areas 2019 > Excel files > Copy of HPTS hours for SDMS - Dentistry

Cartography: Ryan Ossell | Community and Regional Planning Intern | DHHS
For: Thomas Rauner | Primary Care Office Director
thomas.rauner@nebraska.gov | 402-471-0148

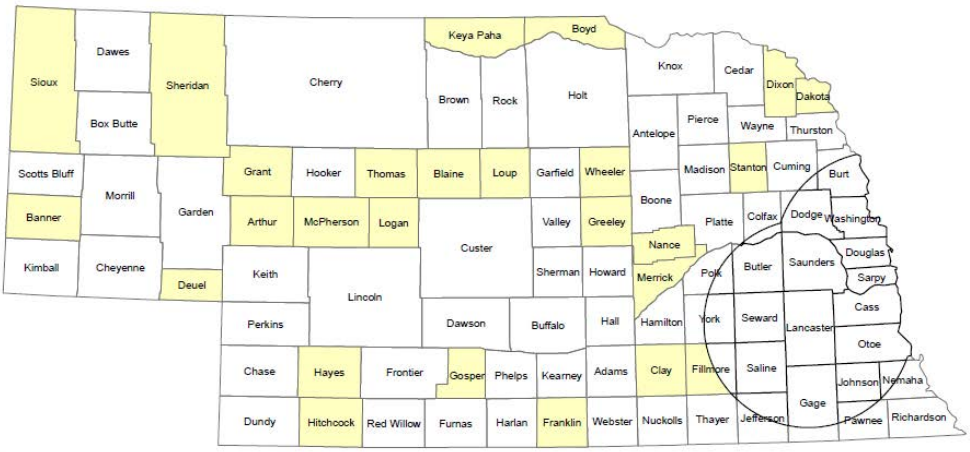
Figure D6. State designated shortage areas for occupational therapy



Source: Rural Health Advisory Commission
DHHS - Nebraska Office of Rural Health
Statewide Review: 2019
Last Updated: April 2019
Location: K: RURAL_HEALTH > Rural Health Intern > State Shortage Areas 2019
Data File Location: K: RURAL_HEALTH > Rural Health Intern > State Shortage Areas 2019 > Excel files > Copy of HPTS hours for shortage area - OT

Cartography: Ryan Ossell | Community and Regional Planning Intern | DHHS
For: Thomas Rauner | Primary Care Office Director
thomas.rauner@nebraska.gov | 402-471-0148

Figure D7. State designated shortage areas for physical therapy



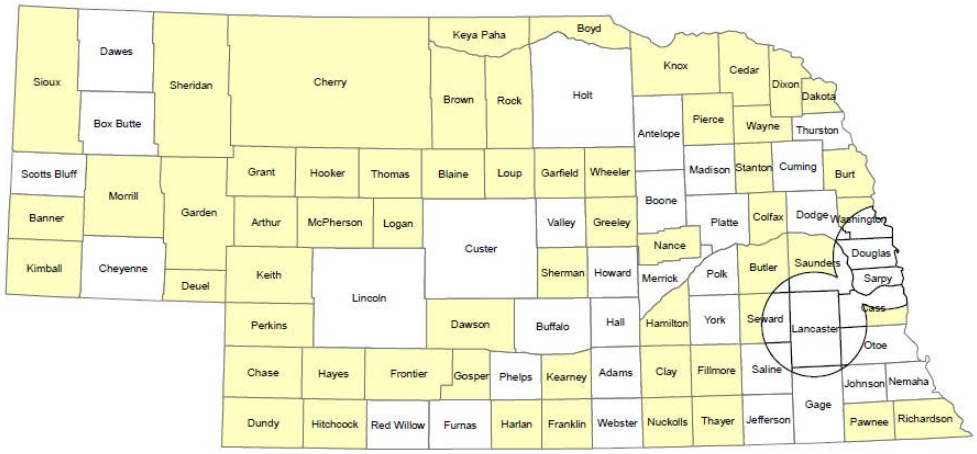
State Shortage Area

Not State Shortage Area

Source: Rural Health Advisory Commission
DHHS - Nebraska Office of Rural Health
Statewide Review: 2019
Last Updated: April 2019
Location: K: RURAL_HEALTH > Rural Health Intern > State Shortage Areas 2019
Data File Location: K: RURAL_HEALTH > Rural Health Intern > State Shortage Areas 2019 > Excel files > Copy of HPTS hours for shortage area - PT

Cartography: Ryan Ossell | Community and Regional Planning Intern | DHHS
For: Thomas Rauner | Primary Care Office Director
thomas.rauner@nebraska.gov | 402-471-0148

Figure D8. State designated shortage areas for pharmacist



State Shortage Area

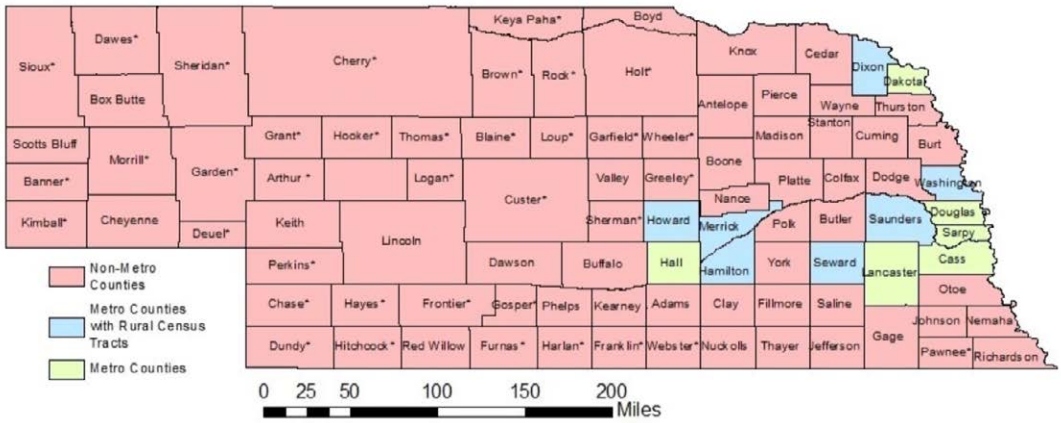
Not State Shortage Area

Source: Rural Health Advisory Commission
DHHS - Nebraska Office of Rural Health
Statewide Review: 2019
Last Updated: April 2019
Location: K: RURAL_HEALTH > Rural Health Intern > State Shortage Areas 2019
Data File Location: K: RURAL_HEALTH > Rural Health Intern > State Shortage Areas 2019 > Excel files > Copy of HPTS hours for SDMS - Pharmacist

Cartography: Ryan Ossell | Community and Regional Planning Intern | DHHS
For: Thomas Rauner | Primary Care Office Director
thomas.rauner@nebraska.gov | 402-471-0148

Appendix E: List of Non-Metro and Metro Counties

Figure E1. Non-metro, frontier and metro counties in Nebraska



*County is designated as a frontier county based on 2010 US Census. Data from the National Center for Frontier Communities.[25] Metro and non-metro classification from the Health Resources and Services Administration Federal Office of Rural Health Policy.[26]

25 National Center for Frontier Communities. Mapping process and data. Available at: http://frontierus.org/mapping-process-and-data/.

26 Federal Office of Rural Health Policy. Health Resources and Services Administration. List of rural counties and designated eligible census tracts in metropolitan counties. Updated Census 2010. Available at: https://www.hrsa.gov/ruralhealth/resources/forhpeligibleareas.pdf